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THE
BEE
WORLD

VOLUME 2
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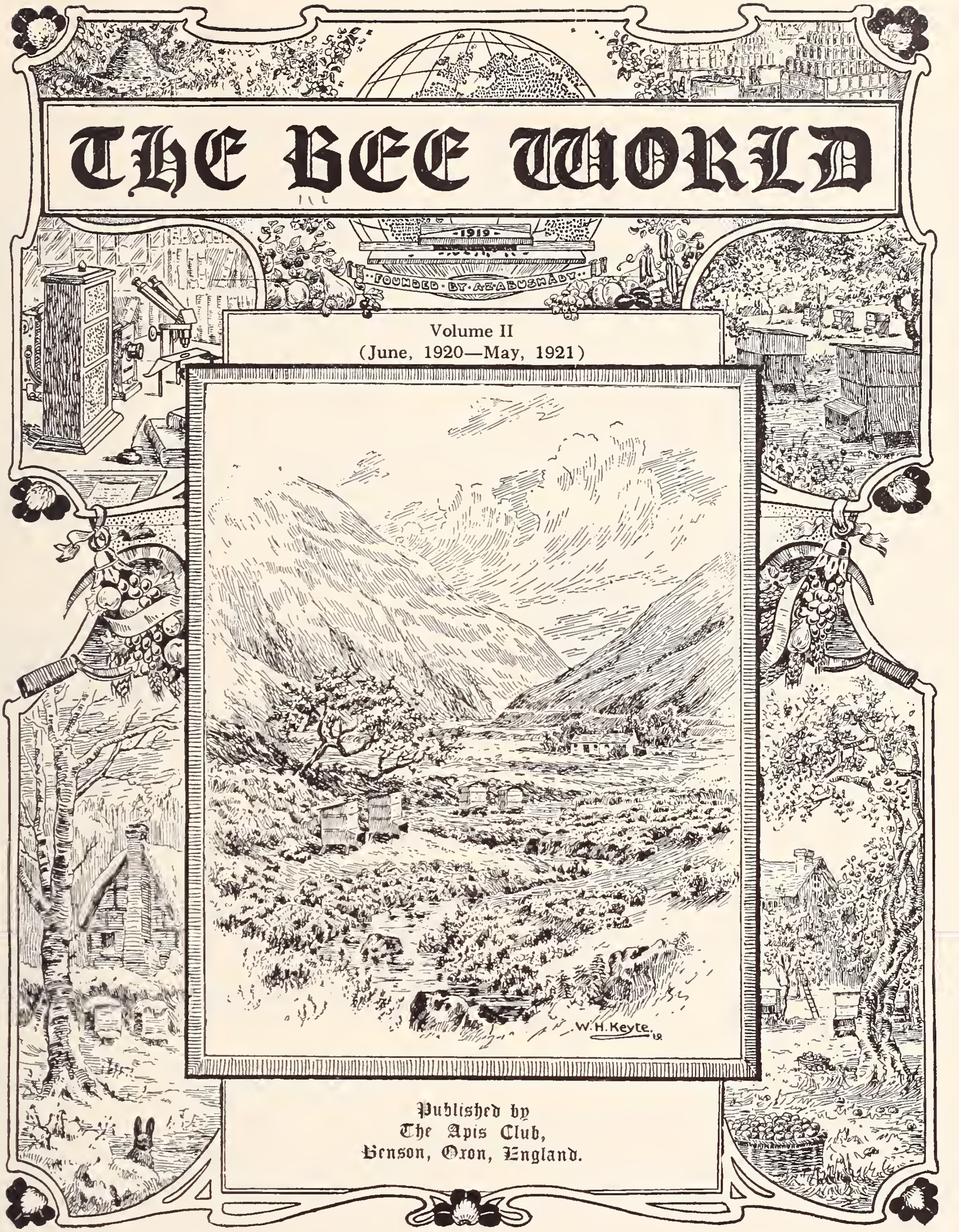

THE BEE WORLD

Volume II
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The Bee World

Founded 1919

An International Monthly Journal devoted to the progressive interests of Modern Bee Culture.

Edited by - - A. Z. ABUSHÂDY.

In vindicating the freedom of the Press, THE BEE WORLD gives full publicity, on questions affecting the advancement of Bee-keeping, to the views of all responsible writers, irrespective of their school or nationality, and without necessarily sharing their opinions. No literary responsibility can therefore be held by this Journal for signed or quoted contributions.

Publishers:

The Apis Club, Port Hill House, Benson, Oxon, England: An International Institute for the service of Modern Apiculture, and for fostering a genial spirit of scholarly brotherhood amongst bee-keepers of all countries, with the co-operative object of promoting their educational and material interests.

⁂ Membership of the **Apis Club** is open to all practical apiarists everywhere, and to all lovers of the Honey Bee. Annual Membership Fee: 10s. 6d., and includes free delivery of this Magazine.

Vol. II. Nos. 1-4. JUNE—SEPTEMBER, 1920. Monthly.

Editorial.

THE SECOND MILESTONE.

With genuine thankfulness to its many friends THE BEE WORLD leaves behind the first milestone of its uphill journey and aims for the second.

Having left no stone unturned to interest the hesitators in co-operating for a big push, it now takes the lead, depending on the support of its champions, at home and abroad, to effect the forward movement of education that is admittedly beyond its present means. How long it will take to realise its great ambition it is difficult to tell, although its past record is a general indicator. But with the continued advance in human thought and labour, the necessity grows for improvement and refinement of intellectual and practical literature, and the claims of this magazine on the enthusiastic support of the International Beekeeping Fraternity grow more and more daily. Let us hope the time is not distant when THE BEE WORLD will become an international bee magazine in the fullest sense.

RE-STOCKING IN DEVASTATED FRANCE AND BELGIUM.

We have great pleasure and pride in publishing the 1918-19 report of the Friends' Mission on the work accomplished in re-stocking with bees the devastated areas of France and Belgium. The Report, couched in the plainest and most succinct form, is a very modest record of an admirable task voluntarily undertaken and successfully achieved.

We honour its initiators and executants and congratulate benefactors and beneficiaries alike on the soundness of the methods employed, the co-operation received and the full measure of success obtained.

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Original Contributions.

Originality is the one thing which unoriginal minds cannot feel the use of.—J. S. MILL.

Greater Honey Production.

By C. P. JARMAN,

Editor, Bee Craft.

The various lines of research, no matter whether they be in relation to anatomy, disease or habits, have one object in view: honey production.

The vast amount of labour which has been expended in the past, which is being exercised now, and will, we hope, develop further in the future, has the one aim of increased honey production as its goal.

Improvements in methods and appliances and improvement in the breed of bees by a slow process, as a result of joint effort, is what we have to rely upon for the advancement of apiculture.

There is probably no other small industry where so much knowledge and aptitude are necessary for the best results, and no other industry perhaps where so much forebearance and openmindedness is needed.

Practical apiculture may be roughly divided into three branches:

Queen rearing,
Comb honey production,
Run honey production;

and when we have to search the wide world to find men who are thoroughly competent in all three branches, it becomes evident that efficiency all round is not to be sought by each of us, but must be left for the exceptional men of whom few are found in a generation.

The object of apiculture being honey production, in the same way as that of poultry keeping is egg production, the average beekeeper would be well advised to devote his attentions exclusively to that branch of the business, and he would do better by confining his attentions to either run or comb honey, and not mixing his outfit.

In buying livestock, as a rule, appearance counts for much and a careful inspection, assisted by the pedigree, enables a purchaser to feel able to rely upon his own judgment. This, however, does not apply to bees, for the queen is the secret of success, and appearances in her case count for next to nothing. It is not possible to detect a degenerate ill-bred queen from a good one.

The one hope of successful beekeeping on commercial lines is the possibility of purchasing queens from reliable breeders, who have made a special study of this branch of the business, and whose living depends upon the maintenance of a **high standard.**

A queen mother of utility queens must first be tested for the honey gathering qualities of her progeny, and quick building up in the spring, so that no queen which has not seen two winters should be used for queen rearing, because no queen younger than this has had a sufficient test to guarantee her qualities.

In regard to feeding, it is not a practical proposition to hand-feed a large commercial apiary. It is therefore necessary to have a brood chamber of sufficient capacity, that at the end of the honey flow it is in excess of the ovipositing requirements of the queen, in order that a store of honey may carry them alone, and in addition, there must be room in the brood chamber for some additional natural stores. Supers should be removed finally, just before the end of the honey flow, so that the last of it may be stored for winter or spring use.

Exceptional circumstances of seasons are sure to arise where some feeding is necessary, but as before stated, hand-feeding takes too much time and labour to be commercially sound, therefore we are driven to the necessity of a frame larger than our Standard, which we must expect in a few years time to be confined in use to experimentalists (we cannot have too many of these) and queen breeders.

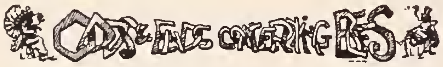
The exact size and shape of frame which will eventually fulfil our requirements, only the future will show, but I am inclined to think that it is more likely to be larger in area than the 16 × 10, than smaller.

The Langstroth frame appears to have reached the practical limit in length, and the depth will probably be a compromise between the requirements for extracted and comb honey.

The longway hive has been tried in America and in this country, and except for queen rearing, has been found of no practical advantage. The ten-frame brood box is likely to survive all efforts to either increase or decrease the number.

Swarming will never be eliminated, but in an apiary which is run as honey producing outfit, the increase should not be excessive; it should, in fact, be kept down to the winter losses figure, which as an apiary grows must grow also, since the delicate attention one is apt to give to the bees in a small apiary cannot possibly be given to a large one.

Let us then strive towards that standard of beekeeping when we can find throughout the country prosperous honey producing businesses, with the regular queen breeders available to keep up that standard of race which is necessary for producing the best results, with the best attention.



By R. WHYTE.

FREE THINKING ON BEE DISEASES.

Our worthy Editor is continually emphasising the need for clear thought and judgment untrammelled by preconceptions. In thinking over the I.W.D. problem, I wondered if we were not in the habit of thinking along certain grooves. As an illustration of what I am driving at, let me relate how the silk-worm plague—Pébrine—was ultimately tackled and solved. Despite all that the experts, Governmental and other, could do to stem the disease, ruin faced the silk industry in France. " Cures " innumerable were tried; drugs used in these " cures " rose enormously in price owing to the run on them.

The French Government finally called on Pasteur to investigate the trouble, and it is interesting to recall how little Pasteur knew about insect life. It may be that his ignorance in this respect helped in the matter of his solving this problem. In this connection, let me relate the following from that Napoleon of Entomology, J. H. Fabre: " Book-knowledge is a poor resource in the problems of life," says Fabre. " In many cases ignorance is a good thing." Relating an incident to illustrate the remark, he describes how Pasteur, who was touring the Avignon region, called upon him unexpectedly one day for the purpose of obtaining some information respecting the silk-worm.

A few words were exchanged upon the prevailing blight; and then without further preamble the visitor said: " I should like to see some cocoons. I have never seen any; I know them only by name. Could you get me some?" The cocoons were obtained and handed to the savant. He took one, turned and turned it between his fingers; he examined it curiously, as one would a strange object from the other end of the world. " Why, it makes a noise!" he said, quite surprised. " There's something inside!" " Of course there is." " What is it?" " The chrysalis." " How do you mean, the chrysalis?"

" I mean the sort of mummy into which the caterpillar changes before becoming a moth." " And has every cocoon one of those things inside of it?" " Obviously. It is to protect the chrysalis that the caterpillar spins." " Really!"

Pasteur had come, as Fabre states, to regenerate the silk-worm, while knowing nothing about caterpillars, cocoons, chrysalises or metamorphoses. He was ignorant of what was known to the meanest school-boy of those parts. And he was about to revolutionise the hygiene of the silkworm nurseries.

The ignorance of the trained thinker is a vastly different thing from the ignorance of the vulgar mind, which is so full of foolish fancies and prejudices—the weeds and thistles which choke the seedlings of more useful types. This great Frenchman approached the subject of the silk-worm plague in a candid open-minded manner, with but the habit and power of free thought to aid him.

Our bee press has teemed with articles by writers who do not always appreciate the lesson taught by Fabre and Pasteur. It is sufficient with some if an idea appears merely plausable, and, when clothed with a redundancy of statement, is set a rolling—a snowball of error.

In the light of the foregoing, my friend, Mr. Fisken, wrote in the **B.B.J.** refering to I.W. disease: " Knowledge should surely precede action." All the " action " taken to stem the ravages of silk-worm disease previous to Pasteur's investigations were worse than useless, as they were not based on knowledge of how to cure the plague.

You, Mr. Editor, reprint † what you think is an answer to Mr. Fisken's admirable axiom wherein the absurd proposition is posited that Mr. Fisken, in terms of his own proposition, should not throw water on his burning house—as if the quenching of fire with water is not a thing we **have** knowledge of! It is surely logic gone crazy to argue (?) in this fashion. By parity of reasoning, there **is** something that will quench I.W. disease. What is it, pray?

HONEY IN EARLY ROMAN TIMES.

According to Menzel, the Romans did not in early times pursue beekeeping in an orderly manner. They contented themselves in gathering the product of wild bees that built their combs in trees or holes in rocks. There is no record of any great consumption of honey or wax.

As the pomp and pleasure of the Romans reached an ever increasing degree, the use of honey and wax reached greater importance and was used in manifold ways.

They offered honey to the gods as well as using it as a gift to friends and favourites. It never failed at a meal where guests were, being served in the comb as well as in liquid form.

In addition to milk it was used in many kinds of foods. It was added to wine; mead and vinegar being made from it, and even the bodies of the dead were embalmed with it. Alone and in conjunction with other things, they used it in medicine.

Wax also played an important part both in the household and in fulfilling the demands of luxury and pageantry, and in the cult of the Gods.

There was a demand for it in taking impressions for written notices in tablets of wax. The multifarious uses that wax was put to in Roman civilization explains why in their later times the Romans could not satisfy the demand at home, and all lands within reach had to contribute their quota. Be it through commerce, tribute or rent, Greece, South West Asia, and North Africa all contributed to the need of the Roman Empire for wax.

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† We take no responsibility for quotations apart from giving full expressions to the views of different schools of beekeepers. The same number of THE BEE WORLD, to which Mr. Whyte refers, contains a quotation from **The Western Honey Bee** which expresses quite a different view.—Ed.

WAX RENDERING.

One of the most heartily disliked jobs in connection with beekeeping is the rendering of wax. Let those who usually melt their wax in a pot of water over a fire try my method for small lots. After trying various methods, I now use a piece of wire cloth—mesh about 30 per inch. I make a box of this, open at the top into which I cram my odds and ends of wax. I put this into the oven of our kitchen range. Under the wire I have an ashet half-filled with water. The oven is made fairly hot and the wax, melting, drops into the water. If I have a lot of odd stuff to melt down I have this crushed into balls and keep the box going as it melts out. It is surprising how much you can melt in an hour. As the ashet fills up I replace it with another. As all muck and debris is left in the wire basket, it is quite a sight to see the nice clean cakes of wax you get. If the heat is fairly sharp there is not much wax left in the cage. One saves by this method all the scraping of dirt that adheres to the bottom of your wax cake when rendering is done by boiling everything in a pot. Try it.

THE MACDONALD COMB AND SOMETHING ABOUT THE MAN AND HIS STRUGGLES.

The path of progress is beset with difficulties and bestrewn with discarded attempts at betterment. In the ebb and flow of human endeavour, in the midst of our own effort, it is difficult to realise actual advancement ; but when viewed in retrospect one can measure the progress achieved from generation to generation. In the matter of the Macdonald metal comb one wonders what the verdict will be a dozen years hence from practical apiarists. I am of opinion that too extravagant claims have been made for it. As a mechanical production I am amazed at the ingenuity displayed in its manufacture.

Whether this comb " fills the bill " or not I sincerely hope a metal or other rigid comb will be produced satisfactory in every way.

In a recent issue of **" The American Magazine"** there is an article on "A Westerner who made Bees change a World-old Habit." This article deals with Macdonald's struggles in the perfecting of the metal comb that we are all so much interested in.

" George Mitchell Macdonald has given the world an invention which will revolutionise bee culture and open a vast new field of investigation " this writer thinks. His, Macdonald's inspiration, came after a long talk with a noted Californian Bee man named Marcellus Seagers.

It was the case of an old scientist passing on to a young man all that science had achieved in apicultural experience.

Macdonald now wanted bees. He started with 10 stocks which were rapidly increased to 300. All went so well that beekeeping appeared to Macdonald like " Standard Oil " stock.

American foul brood however attacked his apiary and wiped him out completely after a few years. Twenty seven hundred dollars worth gone ! Nothing left but hives, rotten combs and dead bees. Macdonald was down and out ! " What I wanted," he said, " was to have the control of that disease in my hands." Apiarists within a radius of six miles lost more than ten thousand dollars in diseased bees. Many giving up in disgust.

" Here was a problem worthy of any man's time and energy," Macdonald reasoned, " to get a comb which the bees would accept and which could be sterilized without destroying it." As he was riding one day the idea of a metallic comb came to him. To the best of his knowledge no one had ever tried this. The difficulty appeared to be would the bees accept them ? "

With this crude idea in his mind, he went to a machine shop. The manager looked him over critically without speaking, heard most of his story, turned impatiently on his heel, and without ceremony ordered him out of the shop. However, he went round to the rear of the shop and exploded the idea to some of the workmen, but everyone laughed at him. " Bees have been working their own combs for the last 5,600 years, one of them volunteered, and nobody has ever made them change their ways and you think you can ? Gears wrong, old man ?"

However, Mac stuck to his idea; got them to make a little machine that cost twelve dollars and finally infected a young mechanic with the idea of metallic combs, and he got the bee-bug so strong, that he has since devoted the last eight years of his life to the perfecting of the metallic comb.

After an enormous amount of labour, they produced their first metal comb made of steel. It was a crude affair and weighed sixteen pounds! This comb was put into an experimental hive and to Macdonald's great delight the bees accepted the comb and filled it with honey.

[*The American Magazine*].

GEORGE MITCHELL MACDONALD,
Inventor of the " Moneycomb."

Says Macdonald : " We had no capital but youth, the sting of defeat, and a steel comb filled with honey. An unbreakable will to win was our greatest asset. We had accumulated so much inertia by willing to achieve, that we could not have stopped had we wanted to. I had obtained permission to set up a humble shop and laboratory in the lean-to of an old barn. A three-horse power motor was put at my disposal when it rained. That young man and I prayed morning, noon and night for rain, against all the recorded meteorological data."

" Every time we heard a flivver, we scrambled up into the haymow thinking the Sheriff on our heels to serve a complaint or writ. The Gas Company lost heart and shut off the gas because of a few dollars owing them. We just kept body and soul together, and worked. My pal had a wife and two babies, and no money. We were always on the ragged edge."

About this time he offered half the United States patent rights in the steel comb for one hundred and fifty dollars. " Man, you're swarming !" he was told ; better tend the ranch—more money in it. The same old rebuffs, the same lack of faith, and always the same armour-plated conservatism on the job.

Steel being too heavy they turned to paper, only to find that the special paper suitable to the job was " made in Germany." Some of his men urged an inferior paper, but he wanted the best or nothing. From paper the next step was to aluminium. Without any hesitation he proceeded to buy aluminium to the full extent of his bank account—fifty-five cents.

With this sum some scrap aluminium was bought, and with the loan of a plumber's pot and ladle, they made their first cast, aluminium comb, with cells seven-sixteenths of an inch in diameter, with walls three-thousandths of an inch in thickness. And the bees put their honey in this likewise. Talk about 'convictions'? Why he was ready to be burnt at the stake for his faith.

A book-keeper had heard of his story, and one day she came to him and, without asking questions, handed over 250 dollars in cash. With this some groceries were bought, some more machinery to equip an aluminium rolling plant and a few other luxuries of a like character. They felt like the Federal Treasury. Now they had to move to respectable quarters. Can you imagine, he says, what kind of a heaven it was to us to find a sick man with all kinds of machinery lying idle and willing to allow us a corner of his shop? "We worked for this man to pay the rent. Then we moved our families into a corner of this factory, and again set to work. My pal and I slept on automobile cushions. When all our money was gone, I would take the stock book of our humble little company to Los Angeles and hold up anybody who would listen to my story.

"When visitors came to the factory we always managed to have a pot of metal ready and everybody working with hundred per cent. absorption in the job, to make the best showing.

"I had taken a long shot in the attempt to make paper combs, and had advertised them. To my great astonishment we got orders immediately for three-thousand dollars worth of combs, but we did not have a dollar's worth of the special paper out of which to make them. Then came the war with Germany; trade was cut off. I couldn't deliver the paper combs.

"I had all but bankrupted myself during the eight years of my struggles to perfect this thing, which would give me control of disease in bees. I had sold 650 cattle, a 55-acre ranch, and had mortgaged my house and lot, and had put all of the proceeds into machinery to make this metal comb. Our first machine cost us 14,000 dollars; we can now make it for 2,500. And there were streams of tears in that machinery. There were many times in my struggles when sorrow and a swollen heart actually robbed me of speech. The suffering of my family and that of my pal, the rebuffs that were incidental to raising cash, the perfidy of those who wanted to take advantage of the patent and gain the controlling interest, now that it was a proved success, and the fact that my own home town had not the vision to accept this invention—all these things added to the almost constant torment with which I had been burdened without a let up.

We had made the egg stand on end once more; we had persuaded bees to use twentieth-century labour saving devices, and had added, after five thousand, six hundred years of recorded time, a great abundance of scientific data to the humble records of the old Roman, Virgil. What is more, the real investigation is just begun.

With the aluminium comb of varying sizes I gradually became master of very important problems in bee culture. The comb is now in extensive use. It has been patented in all the leading countries of the world. The English bee world has ranked it in importance with the invention of a sewing machine and the aeroplane. It is rapidly replacing othes devices among bee men. The extremely cautious and conservative (*sic*) **Apis Club** has pronounced it a complete success."

"It was a hard, hard game. But the battle is over now, and everything is going along smoothly. In addition to achieving what I set out to achieve, one of the greatest satisfactions that I cherish is that I found men who were game to the last ounce of their mental and physical strength, and who stuck until success came. Perhaps that is the supreme satisfaction after all. If my first stand of bees had not died and left me with a sting of defeat, perhaps the metallic honeycomb might not now be in existence. A man is defeated only when he accepts defeat."

Let those of us who work for the success of THE BEE WORLD take to heart and conjugate in all its moods, tenses and inflections, that last sentence of Macdonald's, **"A man is defeated only when he accepts defeat."**

Bee Culture in Ireland.

By the Rev. R. DOUPE.

Ireland is fairly well adapted to bee culture, but owing to variable weather conditions, we seldom get those calm warm spells so necessary for queen mating, so that commercial queen rearing could not be developed into a profitable business. On the other hand, owing to the luxuriant growth from the moist atmosphere, nectar producing plants flourish; and when warm weather comes, the bees luxuriate, if that word can be applied to our little friends to whom work is a delight and the chief object of existence. The winters are mild, particularly in the south and west of the country, so that wintering is not such a problem as in other lands. Dryness in winter with plenty of stores and a moderate covering are all they need, but dryness in a damp climate is not easy to ensure. Hives need some metal covering, as zinc, or the continual damp and rain gets through, also suitable ventilation must be given for the escape of moisture and a concrete stand or flag under the hive, as, if some precautions are not taken, the colony suffers and thus it is we meet people who used to have bees.

Honey is often of mixed origin, as nectar bearing plants of one variety do not abound to the extent they do in warmer lands, but heather and clover honey may often be had pure, and lime tree honey where these trees are plentiful.

An apiary of hundreds of colonies would not be a success and even fifty good colonies would not give a honey crop in one location. In this way Ireland compares unfavourably with, say, U.S.A., but then we do not suffer from drought or hornets. One might keep a hundred colonies or even a much greater number if several apiaries were made and a motor car brought into use.

It is true of more parts of this island than the one of which it was said:—

> "Where tardy Spring his earliest visits paid
> And lingering Autumn's latest blooms delayed."

Furze gives pollen earlier than bees can fly and continues late on in spring, in fact furze or gorse is never out of bloom. And there are late blossoms of many varieties, in particular fuchsia trees in the south and west which help out colonies short of stores to some extent. It is never necessary to use artificial pollen, as natural pollen is always available if bees want it.

Bees are or have been in almost every locality, but in very many cases people own rather than cultivate them, so in cases of late swarming the young queen remaining in the parent hive often fails to mate from weather causes and so the colony dies out. This is often the case and its put down to some other cause, possibly foul brood, which is the most prevalent disease. Starvation also occurs with late swarms or casts, or either, when hived in a rainy and stormy spell of weather and not fed.

But if properly looked after and run on up-to-date methods, bees would do well in any part of the country.

Now, as to methods of housing bees, there are as many ways of keeping them in Ireland as in most other parts of the earth. There is of course the skep, but these are going out of use. There is the box of any sort that comes handy, for a swarm may not wait the leisure of its captor. The barrel and numerous other receptacles.

Hives, so-called, of various patterns in which the combs are or become fixed. The most commonly used hive, that is practical, is the C.D.B., a good hive in its way and a signpost on the road of progress. It contains usually eleven frames 14″ × 8½″, self spacing, and is nicely made, but is on single hive principle and that does not keep very dry as a rule, especially after a few seasons in use. It does for comb honey and will take three supers of twenty-one sections each. It shows progress wherever seen and is good so far as it goes, but a prolific queen soon lays enough to fill all the space allotted and then must swarm, and in any case sixty-three sections which average less than a pound each is not the summum bonum of a colony's existence per year. A much larger brood nest is required for a good queen. A pure native queen will lay up two of above and even three in some cases and the honey crop ought to average a hundred pounds net weight, and there should be capacity to store all the bees can manufacture.

Honey extracting denotes progress in apiculture and is not very commonly used, but in this island liquid honey is easier and safer to ship or transport than comb, also it presents a better appearance and even in use I do not think wax has much food value. It is possibly one reason why some people, a very, very small minority, say honey does not agree with them, whereas most people will eat honey heartily, and many do not grumble if wax, pollen and a few grubs get in the way.

A hive ought to be capable of additional space as required for brood nest or honey storage to suit either a prolific queen or a rich honey harvest. Bees do not often get the chance to store all the honey they could pack in when things are favourable. One meets with people who take off honey towards winter " when the bees go down," and let this be said, whatever mistakes are made from want of knowledge, most people in the Emerald Isle are quite ready to feed back the surplus comb honey "in case the bees might not have enough."

A good deal has been done to instruct people in beekeeping throughout the country with good results. Yet a great number never handle their own hives, but rely on some beekeeper to do all the work. People ought to learn beekeeping as they do butter-making and fowl rearing, yet these two have advanced far more than the cultivation of the insects that produce the oldest and purest sweet in the world.

Scientific Queen Rearing.

By JULIAN E. LOCKWOOD.

The time has now arrived when most beekeepers who are desirous of improving their strain of bees will be busy preparing for queen-rearing, which is probably one of the most interesting as well as educational parts of modern bee culture.

In the October issue of THE BEE WORLD, I dealt with " Selective Queen Mating," but I now will turn my attention to one or two up-to-date methods of rearing queens. It is a deplorable state of affairs and one which does little credit to British Apiculture when I say (and I say confidently) that the general run of beekeepers give no attention whatever to the improvement of their bees, and as a touring expert, I have had a great deal of confirmation to justify me making these remarks.

One very good method of queen raising is to take the queen cells from a hive which has swarmed and utilise them in forming nuclei. These cells being raised under the natural swarming instinct are undoubtedly the finest to be got, but at the same time I do not recommend it unless the stocks which have swarmed are of a good strain and fit to breed from. We must bear in mind that there are certain points to be noticed when rearing queens, for unless we replace a queen with a superior strain, I fail to see the advantage of re-queening at all.

The scientific queen rearer will breed by selection. From his hive record cards, he will notice that certain hives have given good yields of honey far and away ahead of other hives in the apiary. Further, he will notice that the offspring from this or that hive are long lived, good tempered and practically immune to disease. Now having noticed these points, the modern queen rearer will select the very best two queens in the apiary and from one he will rear his queens and the other stock he will use for drone breeding. Now, if we follow the method given above, we might have to wait weeks before this or that hive swarmed, and if we took the cells from a swarmed stock, they would probably be a lot far from having the desirable qualities we want. Hence the advanced queen breeder must use more scientific methods.

First of all I am going to describe the Grafting method which I use throughout my own Bee Farm. This is generally known as the " Doolittle " method and by its use the choicest queens are to be obtained. By using this method we can turn out any number of queens at a uniform rate to meet whatever demand there is. To proceed by this method we require some artificial cell cups, a mandril for forming the cells and a grub tool for transferring the larvæ.

These cell cups are fixed to strips of wood which should be the inside measurements of the length of the bottom bar of the frame. Some beeswax is now melted slowly over a stove in a shallow vessel which should be small. We now use the mandril which is about the thickness of a lead pencil with a rounded end. A mark should be made about nine-sixteenths of an inch from the rounded end. After soaking the mandril in water , it is dipped into the melted wax as far as the pencil mark and quickly withdrawn with a circular motion to evenly distribute the wax. This is repeated several times, each time dipping not quite so deep till the cell is made. When the wax has hardened, the cell is taken off and we find we have a good cell thick at the base and gradually tapering to the end. After a few times these cells can be made very rapidly.

Using the melted beeswax, we now fix the cells on the cell cups and, having completed the strip of wood with as many cells as required, it is now ready for use.

We now go to a strong hive and remove from it the queen and about 3 frames of brood and honey and form a nucleus with this lot. We now go to another hive, the one selected for its desirable qualities, and in the centre of the brood nest we place a frame of wired foundation. In four days time we go to the stock made queenless and remove all the queen cells which have been started. These will do for the supply of royal jelly for our cells which we have grafted. The next thing to do is to go to our selected hive to which we have given the sheet of foundation 4 days previously. This is now taken out and the bees carefully brushed off. This is now taken to the Grafting House or a warm room and care must be taken that the young eggs and larvæ are not chilled. We now fill the artificial cells with a little royal jelly obtained from the queen cells we took from our queenless stock. At one end of the grub tool we find a tiny spoon and with this we insert a little royal jelly into our cells about the size of a pin's head. Having completed the number of cells required, we now proceed to take and transfer the larvæ from our frame which we have removed from the selected stock. These can be removed by means of the grub tool, a piece of horse hair or even a tooth pick and care must be taken not to select larvæ more than 24 hours old. These are carefully taken and placed in the royal jelly previously put in the artificial cells. We now get an old frame containing brood and cut half of the comb away and under this comb we fix our strip of prepared cell cups which are now ready to be given to the queenless lot. This is now inserted right in the centre of the brood nest and it is a good thing to remove any unsealed brood and in the place of these combs removed, we can give a frame or two of sealed brood. The hive now being absolutely queenless will readily accept these artificial cells and in a few days we shall have some of the finest cells it is possible to get. If honey is not being brought, this hive must be liberally fed.

The question now arises as to the care of these cells. If a large number of cells are wanted, it may be necessary to have a cell finishing colony, but I have not the time or the space to go into this matter.

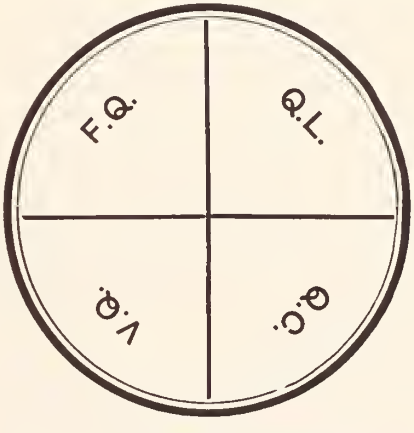

Fig. 1.—Mating Box Indicator.

The Letters are placed at an arrow on hive to notify condition.
Q.C.—Queen Cell.
V.Q.—Virgin Queen.
F.Q.—Fertile Queen.
Q.L.—Queen Lost.

The queens are due to hatch out on the sixteenth day from the laying of the egg and providing the larvæ which we transferred were about 24 hours old, we can leave them in the hive till the eighth or ninth evening when they are given to the nuclei.

In order to use as few bees as possible when making nuclei, I use in my own Bee Farm a twin nucleus hive to take 2 shallow frames on each side of the division board. This is very convenient and does not call on the brood frames of other hives for the purpose of making nuclei. These little hives I make out of spare boxes and they are fitted with a tight fitting division board with an entrance at each side. I now take 2 shallow frames of brood and honey and place them in these boxes (2 on each side), first of all shaking in an extra frame of bees to allow for any of the old bees returning. To each of these I give one of the queen cells, and if given at the time of making the nucleus, it is as well to put them in a queen cell protector. The entrances are now stuffed with moss and the mating box placed in the position it is to occupy, and if after 48 hours the bees are not flying, the moss is removed. On examining the nucleus, you will find as fine a virgin queen as you could wish for, and given good weather, she will be mated in 7 to 10 days. These twin boxes are fitted with a special indicator which denotes whether the nucleus has a queen cell, a virgin queen, a fertile queen, or whether or not the queen has been lost in her mating flight. Thus without opening the hive we can tell at a glance the position of affairs. By having twin nucleus hives and bees on each side of the division board, the heat is kept up and directly the queens are mated other queen cells can be given.

Another mating box I have used when having more cells than nuclei to receive them is the "Rauchfuss Mating Box," which is probably the smallest mating box used. This is a baby nucleus and consists of 3 sections with a removable front and back and top and bottom. The sections which are 2-way form the sides. To make up this baby nucleus, we obtain 2 sections of honey and in the middle section we place a piece of sealed brood. From a strong colony we take a cupful of bees and when these are given the box is stocked. The entrance which is in the middle of the front piece of wood is closed by means of a piece of wood revolving on a screw. When all these little nuclei are made up, a virgin queen is run in 12 hours later through the entrance hole and the nuclei are then taken and tied up in trees. The bees should not be liberated till 48 hours after making. Given good weather, I have had several good queens mated by this method but they are almost too small to recommend and easily get robbed out. There are many other ways of queen rearing I should like to mention, but space is limited and I am afraid that I have already taken up more than my share. In conclusion, I think I may say that nothing does a beekeeper more credit than to show his beekeeping friends a nice row of queen cells made by his own grafting. I have every confidence in recommending this method in preference to many others.

Beekeeping in Portugal.—II.

By Dr. ROCHA D'AMORIM,

Apicultural Editor, "A Gazeta das Aldeias."

[Translated by Mrs. G. B. Mitchell].

In a preceding article upon the evolution of beekeeping in Portugal, we enquired, after passing in review, the exceptionally favourable conditions to bee life in this country, the reason or reasons why movable frame beekeeping has not yet attained that degree of development and prosperity which might have been expected.

Fulfilling the promise which we then made, we to-day return to the subject to explain the motives which, in our opinion, made difficulties, and still place obstacles in the way of the rational culture of bees in modern frame hives.

Even in a superficial examination of the question, what immediately strikes us as a formidable obstacle to the progress of the new method, is the unfortunate choice of the type of hive which was first used here and which by no means could be adapted to the especial exigencies of the country, the rudimentary intellectual and professional culture of the majority of Portuguese beekeepers.

The beginning was late and bad.

The first hive introduced by the Visconde de Villar d'Allen, about 1880 was the "Sussex," an English hive.

By its small size it could not in any way give any guarantee of success, and still less in Portugal, where the diffusion of technical instruction is in the inverse ratio to the abundance of the honey flora.

The results obtained from this hive were never encouraging and in spite of its defence and the praise of it by Sr. Cristiano Vanzeller, one of our most distinguished beekeepers, and its warm defender, it never was able to captivate the esteem of practical men, or to spread in the country.

Some years after the arrival of the first "Sussex" another type was imported, a French hive, the "Gariel," which the importers slightly altered.

Even this time the selection was most unfortunate, giving the preference to a model full of defects in its construction, and besides this of inadequate dimensions for the place for which it was destined. As it was also a small hive and of difficult management, the cases of failure were more numerous than the successes which rewarded those who adopted it.

The disasters which attended these two first attempts at moveable frame beekeeping, caused a great discouragement even in the most enthusiastic innovators, and an atmosphere of distrust, and even hostility amongst the generality of beekeepers, always clinging to the antique routine of the cork hives.

Against this ill-feeling, persistent and disdainful came shaking and breaking it about two dozen years ago, the efforts of some resolute propagandists, who have defended the new ideas and processes with the faith of true apostles.

And allow me here to cite as an act of justice, the name of, one only, the late naturalist, Eduardo Sequeira, (*) who, having adopted and experimented with a new type of hive, the "Dadant-Blatt," served the cause of national beekeeping admirably.

I believe that after the renovating movement initiated by Mr. E. Sequeira about 25 years ago, the attractive industry, which has to serve it the most admirable workers of all creation, entered into that road which may lead it, in this lovely corner of Europe, to the most brilliant destiny.

But the progress must be slower than we desire, because other causes of backwardness have to be conquered, which are powerful shackles on its future development.

Amongst them especially stands out the ignorance of the Portuguese people, greatly needing general elementary instruction, and completely wanting in the technical instruction which bee culture requires.

Officially there is no one who teaches beekeeping as it should be taught, and few are those who are able or willing to lend their services.

Deprived of oral instruction, there is no other means of learning.

They could do it if they were able to read good treatises and special reviews, where they could learn the most solid and recent teaching, which at present is completely hidden from them.

In Portuguese there are no books on beekeeping which might guide them safely, and even if there were, many could not make use of them, as they cannot read.

Amongst those who can read only a very small minority are able to consult the foreign guides or reviews. They are the priests, engineers, agricultural chiefs, doctors, or lawyers, i.e., people who have a superior education, and these are few compared with the great mass of the rural population, which entirely dedicate their lives to agriculture and the small allied industries.

Where there is no good guide to beekeeping, it is not to be wondered at that there should be also a want of journals and reviews which are the complement of a guide, enabling experts to make a complete specialization. Unfortunately this is so, as in Portugal there is not one solitary review which occupies itself exclusively with beekeeping. Even the journal and reviews which teach general agriculture are very few, and of these only one or two have a small section devoted to beekeeping. With such scarce fountains of learning how could the ignorant people rapidly learn to perfect themselves in beekeeping ?

But there are other obstacles of a pernicious influence and difficult to remove. They are the absolute want of protection on the part of the State, and the difficulty which the country people find in understanding the benefits of co-operation, showing themselves extremely reluctant to forming a trade union.

All that the State has done to help an infant industry, is in passing a law which up to a certain point favours and encourages it, if it were complied with; unfortunately, however, this law, made by the Parliament of the Republic, never had even the beginning of being put in force.

The organization of mutual help, which has done such good service in other countries, is still undone, not one solitary association exists at the present moment.

After what I have written, it would naturally appear to anyone who did not know the Portuguese people thoroughly, that in such surrounding, and with such people, the progress of rational beekeeping would be impossible. He would be mistaken.

The Portuguese, like all their brethren of the Latin races, have great defects, but also possess admirable qualities. They have not the serenity of temperament calm and cold of northern peoples; but they have more than enough of the passionate enthusiasm which dedicates itself to any idea in which it discovers beauty, justice or utility.

Essentially emotional and sentimental, the Portuguese passionately love the people and things which surround them, and they thus

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(*) Eduardo Sequeira wrote and published a book on beekeeping **"As Abelhas"** which Dr. Rocha d'Amorim does not seem to admire; I have read the book attentively, and it seems to me that he follows pretty closely the teaching of the **British Beekeepers Guide Book.**—G.B.M.

love as no others the land, the plants, the animals which they have seen born and with which they live.

In the people of the Anglo-Saxon race, cold and imperturbable reflexion easily leads them to abandon any exploration or business of precarious or insufficient success. The Portuguese are not so.

In thousands and thousands of cases, the farming enterprise on which they spend their activity does not yield enough to keep themselves or their families comfortably and they undergo privations, but still do not abandon it because above the idea of gain is the tenacious affection which binds them to the fields which they cultivate, the trees which give them shade, the fruit, and the animals which help them in their labours and which feed them and theirs.

Bees are not an exception; on the contrary, they are extremely fond of them, and if they don't treat them better, it is only for want of better knowledge.

To sum up: one can see that to advance in this as in other branches of human activity, the only thing which they needed and still need is the help of professional and devoted experts, who might point out the road, and guide and support them in their first feeble attempts. A great part of the directors they have had until to-day, have done nothing but upset and bewilder them.

I have faith that good and competent men will appear in time, and therefore I have confidence in the brilliant destiny of beekeeping in Portugal.

The Bees and their Moods.

By the Rev. WILLIAM H. RICHARDSON.

Yes! Bees have moods as truly as human beings and the beekeepers to succeed must study them. To get the best out of human nature is impossible if we treat all people alike; and to treat most people in the same way invariably would be fatal to happy progress. There is not only variety of people, but a continuous changing of moods in the same people. And all this can and should be applied to the populations of our apiaries.

General manipulation of normal stocks at any period of the year will speedily prove this true, especially if the operator is inefficient. Indeed a little touch of clumsiness will transform a community of foragers into aggressive warriors. But the most expert of our fraternity in the work of inspection know the marked dissimilarity of moods, not only of different races, but within a particular race. And it is the work of a very short span of time to change completely the disposition of the bee mind. When all goes well within the hive and conditions without contribute to prosperity, the factors are present which conduce to a sense of good-natured satisfaction on the part of the bees, making our work safe and easy. But how different things are with a cold spell of wet, or a chilling east wind, or with the honey-flow on the ebb. The gentlest strains may then reveal a certain vicious tendency hitherto unsuspected. How resentful a generally good-tempered bee may become! We ought ever to count on the possibility of surprise and a watchful eye and a quick ear would readily detect the changing moods.

Rev. WILLIAM H. RICHARDSON.

That there is a "swarming" mood most beekeepers are too well aware. This mood is not so subtle as some others, but it is a fruitful cause of worry to many of our craft. Its presence may be quickly discovered by opening the brood chamber. Developing queen cells are usually conclusive proof. Of course not always, for there is the possibility of simple supersedure. Now it is not for us to discuss here the genesis of this mood. Causes may be various. It is, however, within our scope to ask how it may be changed or cured. It is occasionally possible by the removal of royal cells. Extra space or air make all the difference at times. But in the worst cases certainty ever lies with the removal of all brood, leaving queen and working bees on the old stand along with their supers. Full frames of foundation should be given in place of the frames removed. After about ten days, all queen cells should be cut from the removed frames, which should be kept by the side of parent stock, after which they could be placed above the established colony to form an additional super. For successful fusion all that is necessary is a very thin sheet of newspaper between the chambers and a piece of perforated zinc above to give air. This should be done in the evening when the bees have had a good day foraging.

Disastrous moods have declared themselves when the union of two or more stocks has been in process. Sometimes the result has been wholesale slaughter, the surviving remnant being weaker than either of the single stocks, the cause being the clash of moods. With equivalence of moods the task of uniting need never be feared. Colour, race or scent are of little importance and can be ignored. The great necessity is the production of similarity of mood. You may, for instance, scent or flour hungry bees and those that have had access to food, but you have no guarantee they will amalgamate. The hungry and despairing are obviously not of the same disposition of mind as the full and satisfied. Again, queenless bees do not easily coalesce with bees in possession of a queen whether fertile or virgin. Moods ought to be equalised by (1) making both stocks queenless for three days; (2) by giving a queen temporarily to the queenless stock, thereby lifting them to the mood of those with a queen, or (3) by transferring the queen from her own bees for a few hours to the queenless lot to be united. In this latter case, the bees should be united the same night, the queen being caged a couple of days on a central comb. By this method the moods of the stocks under consideration are made to approximate. This principle should be applied to the case where the union is desired of stocks possessing a fertile and virgin queen respectively unless the virgin is to be retained, in which event the fertile queen should be removed as well as the virgin, union taking place after three days and the virgin being introduced after seven days with the assistance of a cage.

Then a study of bee moods is of paramount importance when the question of requeening is concerned. There are times when any attempt at introduction would be attended with fatal consequences. It is not simply the imposition of an alien that upsets the apiarist's calculations, for the same treatment would be meted out to the queen deposed if returned under the same conditions, i.e., the stock being of the same mood as when the alien's introduction was attempted, or the original queen being in the same mood as the alien or return to her home and family. The mood of a queen is a matter almost equally serious as the mood of the stock. Often times the fault is with the queen and not the bees. An agitated and terrified queen cannot easily be given even to a calm and undisturbed stock. A mood of fear on the part of a queen is always against her reception.

What I will call the "unsuspecting" mood conditioned by a sense of happy satisfaction is usually good, but only for the introduction of fertile queens where a laying queen presides or a **newly-hatched** virgin where young queens may be expected shortly to leave their cells. In the case of a fertile queen just when the bees are busiest, as near midday as possible, the hive should be opened, the stock dequeened, and a vigorous matron fresh from laying in her own hive allowed to enter the hive at once. Care must be taken not to agitate bees or queen. In the case of a very young virgin (one several days old will **not** meet the case) there must be no disturbance of bees and the operation should be performed through feed-hole in quilts at noon or late evening.

There is also the "expectant" mood when bees have been robbed of their queen a few hours previously. Naturally the bees expect their anxious search to be rewarded, for they have not reached the point of despair. But equally so do they expect finding their queen in a certain condition—i.e., hungry and soliciting food. To ensure success therefore it is necessary to deny the queen we would introduce access to food. Hence she must be kept alone for a short time but warm and introduced at nightfall by the feed-hole or under edge of quilts. A puff of smoke would assist, but no touch of carbolic cloth or other odourous matter should be resorted to

Our friend, Mr. Simmins, lays great stress on the probability of success on the evening of the third day, and his method works excellently. Why? I think I am right when I say the bees have reached the mood of " despair " so far as the return of the original queen is concerned, and what helps matters is the fact that rapid development of royal cells has not yet encouraged a looking forward to the hatching of virgins. The same mood seems to be again developed when bees are spoiled by destruction of queen cells, or other methods, of every chance to requeen themselves. Then it is a very simple matter to introduce a queen by running her in at the entrance at evening. Indeed under these circumstances the writer has never attempted the introduction of a fertile queen in vain. A virgin is not so readily accepted and would be safer in a cage for 48 hours or so, by which time the right mood would be produced. Of course in all cases when beekeepers cannot trust these quick introductions, reliance on the cage is essential.

It should be noted, however, that permanently satisfactory moods when queens are being given can only be guaranteed in the honey flow or when generous feeding is resorted to. Disaster often follows too early and careless manipulation after requeening. The right mood must be secured and also retained till normal conditions return.

The Carniolan Alpine Bee.

By JAN STRGAR.

The Carniolan Alpine bee is of the same external appearance as the German bee, with the exception that in colour she is of much lighter shade than the latter. Her colour is whitish gray. But her most advantageous characteristics are her gentleness, hardiness, industry and immense prolificness.

The gentleness of the Carniolan Alpine bee is acknowledged by all beekeepers who have handled her. In Carniola the apiaries are often near roads and open places frequented by adults and children, but it never occurs that people or animals are attacked by bees. Children play around the apiaries, without being endangered by them. Bee veils in Carniola are not used. Carniolan beekeepers brush the swarms with bare hands into the basket.

The gentleness of the Carniolan bee has won her many friends among the apiarists of the world, and not a few of them have become such only on account of this virtue.

Regarding the industry and diligence of the Carniolan bee, let us cite an excerpt from the book " **Die Krainer Biene** " (The Carniolan Bee), which A. Alfonsus, one of the foremost German experts in apiculture, has published:

" That the Carniolan bee is especially adapted for places with late honey flow, is a long-known fact. But the expert beekeeper, living in localities where only one early flow occurs, will certainly appreciate and utilize her unexcelled virtues even under such conditions.

" In proof of the great economical value of the Carniolan Alpine bee, the significant fact may be stated, that the export of this bee, without any great **effort** of advertising, has reached much larger dimensions, than the Italian bee, whose praises eminent apiculturists so loudly proclaimed.

Under all conditions, the Carniolan bee is a valuable creature for breeding purposes, and we are glad that she has met with such a widespread appreciation of her utility."

The grey Carniolan bee of the Alps—the legs and greater part of whose body is covered with a hoary filament, whose exterior shows sturdiness combined with agility—could have evolved these external characteristics only in the higher altitudes of her home mountains, the western spurs of the Julian Alps and Karawanks, where, in the earliest spring (and even in February), exposed to the biting winds and stinging frosts of the glaciers, she searches the highest peak after flowers and blossoms that the weak rays of the sun of this season have called from the clefts and crevices of the barren mountain sides. The unfavourable location, the rarity of the nectar-bearing blossoms, the long way of ascent and descent in the teeth of inclement elements, have steeled her body, sharpened her honey-finding instinct, and developed the grim determination and undaunted perseverence to get the nectar even from plants, the blossoms of which refuse to yield the same to other races of bees that have been bred and reared amidst more comfortable physical environments.

The immense prolificness of the Carniolan Alpine bee is instanced by Mr. Gerstung, expert and writer on apiculture, in the following words. " A small swarm of Carniolan Alpine bees, received on May 16th, developed so rapidly that at the end of June ten frames (40 × 25 in. comb surface) were compactly filled with brood and honey. The swarm gave a virgin swarm weighing 6 pounds net, from 35,000 to 40,000 bees ; adding to this number, say 10,000 bees that did not leave with the swarm, taking into consideration that at least three weeks elapsed after the arrival of the bees before the first hatch reached the flying stage. Then we come to the conclusion that in 10 days 52,000 bees were hatched from eggs the queen had laid. We must place the eggs in the brood cells at the time when the swarming occurred at about the same number. This gives us the fact that during the period from May 16, until June 27, (day of swarming), the queen laid 100,000 worker eggs—averaging 2,500 daily. As in the first three weeks, on account of the smallness of the colony, the egg production during the later stages must have been not less than 4,000."

Yes ; the Carniolan Alpine bees are undoubtedly the most prolific breeders, passing easily through the most severe winters and in the spring, building up rapidly. Any child or woman can manipulate them without fear of being stung, such is their gentleness. They sting only in self-defence, as the result of being roughly handled. Further advantages they offer to the beekeeper are : they make very little propolis, are exceptionally good comb builders, and finish the cap and combs very white. The good qualities of the Carniolan bee, once known, will make this race of bees the favourite among all others. Let us here mention that for queen rearing purposes, the Carniolan Alpine bee cannot be surpassed. At the time of swarming, 50 and more queen cells in the colonies can be found.

It is no exaggeration if we here express the conviction, that the bee of the future will be a new and superior strain of bees, whose chief attributes, industry, hardiness, prolificness and gentleness, she will have derived from the Carniolan Alpine bee.

A Plea for a Larger Frame.

By D. M. CUTHBERTSON.

To obtain honey is the primary object of beekeeping. To agree with this is not to deny that bees may be kept for rearing queens, for breeding more bees, for purposes of purely scientific study, or for the pleasure it gives any right-minded man to hear their pleasant hum and observe the wonderful economy of hive life about which we have still so much to learn.

Bees are self-sufficient insects. Put them into a weather-proof box and they are quite capable of looking after themselves. They will work for themselves but we want more than that; we want them to work for us—to produce a surplus of honey which we may remove without harming the bees. It is for this reason that the modern movable frame hive came to be evolved.

To obtain the maximum honey yield the largest possible force of worker bees is required in each hive. Two hives will not produce as much as one with a population equal to the two combined. A large population implies a prolific queen; a prolific queen requires a large brood nest, and this is where the trouble arises. A modern queen of good strain soon fills up 10 British Standard frames; she has no more room to lay except as the brood hatches out. The hive is full of bees, there are not enough larvae to be fed, queen cells are constructed and swarming is the inevitable result. The present standard frame is too small—there can be no doubt about that. It may be large enough for an inferior queen, but we don't want poor queens!

To overcome the difficulty, some beekeepers have adopted double brood chambers, which is a step in the right direction, but there are certain drawbacks. A queen will **not** lay so well when she has to divide her attentions between two chambers of relatively small frames as she will in one chamber of larger frames.

American experience (not to mention Canadian and New Zealand) ought to have convinced even the most conservative in this country of the advantages of a large frame over a small one.

What British beekeepers should ask themselves is not whether they should adopt a larger frame; but which larger frame they should use. All things considered, I do not think there is a more suitable frame than Simmin's Commercial (16″ × 10″). It is obtainable from any appliance dealer, and can be used in any ordinary W.B.C. type of hive which is not too small to take a brood box of eleven standard frames, by simply using another brood box of the right size. There is not the same waste of space in a hive taking 16″ × 10″ frames as in one taking only the present standard, as the former frames have not the needlessly long lugs of the latter.

No one who has had even a single season's experience of bees on 16″ × 10″ frames would wish to go back to the Standards. The bees winter better on the larger frames (having more honey above them), build up quicker in the Spring, develop a larger brood nest, have less tendency to swarm, and, last but not least, **store more honey.**

The only fault of the commercial frame is perhaps that it might be still larger, and if American equipment were more easily obtainable in this country, we might make another choice. But if we had a larger frame than the Commercial we could not use it in our W.B.C. hives (unless they were larger than is usual) and new ones would have to be obtained.

When a larger frame has been adopted by practical beekeepers, a new era of honey production will be inaugurated in this country, and not till then.

Graded Sections.

By GILBERT BARRATT.

Bee Diseases Legislation.

In the last issue of THE BEE WORLD, Mr. J. Herrod-Hempsall, writing upon this subject, does not agree with Mr. Whyte that the proposed Bill is not educative, and defends its educational value by references to vague utterances made by Dr. Keeble and Mr. Wellington, at the recent conference. That these are not of the slightest value, and obviously intended to placate those with whom they are not in harmony, is proved by the non-fulfilment of promises made in other departments of our Government, and by more responsible people. In any administration of a Bee Diseases Bill, the defendant would be very quickly judged by the Law as it stands, and not by undetermined pronouncements made by men who frankly admit that they know nothing of apiculture. * The fact remains that, as it stands, the proposed Bill contains no word or promise of an educational character, and as such, must be condemned; our salvation lies in our own hands, and I most heartily agree with you that those stocks which have been attacked by I.W.D, and have recovered, are of the greatest possible value, yet these, under the proposed Bill, are liable to extermination by any irresponsible inspector. The base of my own Italian strain was a queen that threw a vast number of crawlers, was almost denuded of bees, and then built up to a good wintering stock, without the help of either bee, brood or antiseptics. I have given this strain diseased combs (if there are any such things, which, personally, I doubt), and fed them on syrup containing crushed crawlers, and no disease has developed. Are not these, and similar strains, of more value than reams of Bills?

CARNIOLAN BEES.

I was very pleased to see in the **B.B.J.**, for July 29th, that Messrs. Adminson Ltd. had been appointed sole agents for the supply of queens from our old friend, Jan Strgar. It is many years since I have seen or used queens from this noted breeder, having discontinued their use at the height of the I.W.D. plague, but I have no hesitation in saying that **a cross between these bees, and a good Italian strain, will produce the finest honey getters it is possible to obtain,** with the added advantages of beautiful white cappings, and great prolificacy. The complaint in former years, that Carniolans were inveterate swarmers, was possibly due to the fact that unscrupulous dealers often sent out old queens, and also, that their great prolificacy being unrecognised by many beekeepers, sufficient comb accommodation was not provided. I hope to establish an out-apiary of these bees next season.

EMBEDDING FOUNDATION.

A good tip is given in the American journals on this subject, and that is, to use the ordinary supply of electricity, putting the ordinary electric iron into the circuit for resistance. Of course this method is only available for a small minority of beekeepers, apiculture being a rural pursuit, but where available, this method works to perfection, the wire sinking into the middle of the foundation without leaving a trace of its passage, and remaining invisible, a dozen frames may be embedded by this method whilst two are being done by the spur embedder. In future I shall use no other method, it works equally well with three "Standard" wires or five "Commercial." If the wires are all horizontal, and not crossed, the whole frame is done quickly with one contact.

INTENSIVE AUTUMNAL BROOD PRODUCTION.

Mr. Sturges's valuable article in the recent issue of THE BEE WORLD is interesting, in as much as it departs from the shibboleths of the Cowan school, by proving how useless it is to attempt to raise brood (and therefore queens), in any quantity with anything but plenty of young bees. Autumn hatched bees are just as "young" in March as at the first clustering in winter. It is not a question of argument or theory, that the feeding glands are large and active in the young bee, and atrophied in the old bee, but one of ocular dissective proof, and as such, indisputable. Let us combat, by every means in our power, the pernicious system of making 3-frame nuclei, and forcing them to rear their own queen, or rearing queens by flying bees only, for this way lies disease.

"HYBRID" QUEENS.

How is it, that in the advertisement columns of the bee press, advertisers are willing to accept a much lower price for "hybrid" queens than for pure ones? Bee men are certainly not noted for their business qualities, but why rear these queens at all, and why the difference in price? The cost of a pure queen mother, compared with a scrub queen, is negligible, when spread over her queen progeny, and all queens cost the same to rear and mate. Perhaps it is that queen cells are saved from any and every stock in the apiary, but this should not be tolerated, and if these queens were left severely alone, their sale would quickly cease; there is plenty of "hybrid" in a pure queen cross-mated, and in nearly every case, the correct mating of pure virgins is not guaranteed.

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* THE BEE WORLD, Vol. I., p. 174.

HIVE PRODUCTION.

Mr. Manley deserves the thanks of beekeepers for insisting, in the production of his hive, that good substantial timber is used, but I have one fault to find with the hive made by Mr. Meadows, named the "**Junior Manley.**" This is a hive made exactly as Mr. Manley's 16 × 10, but constructed to take "Standard" frames. The fault is, that these "Standard" frames are made with 15½″ top bars. Whilst I cordially agree that the inch and-a-half excrescence at each end of the frame is useless, yet, as the hive is made square, this only just allows for ten frames, and most beekeepers know the misery of attempting to handle a strong stock with bulging combs, with no facilities for spacing. Had it been made to take "Standard" frames, this would have been obviated, but for the sake of saving a few inches of timber, a really good hive is rendered worthless.

THE FAMOUS CONFERENCE.

It were well to allow this to drop into well-merited oblivion, but various opinions have been recorded in the bee press, as to the fairness or otherwise, of the Chair, on this occasion. Possibly a fact, instead of opinions, will clarify the atmosphere. Before the discussion opened, Dr. Keeble ruled that, (1), anyone wishing to speak, must come to the platform ; (2) must give his name, and where from; (3) would be allowed three minutes, and (4) must confine his remarks to the subject in hand. Mr. Allbon, of Hitchin, one of the few commercial beekeepers present, went up to the platform, furnished with statistics prepared with great care from countries where legislation is in force—information that would have been of inestimable value in considering this question. At the time, a clerical gentleman was ignoring the dictum of the Chair on all four points, in that (1) he was speaking from his seat, (2) did not state his name, or where from, (3) occupied six minutes, and (4) his remarks were entirely irrelevant. The last two points may be easily verified by referring to the official report in the **B.B.J.** or the B.W. The Rev. gentleman was allowed to proceed without a word from the Chairman, whilst Mr. Allbon remained standing, and was finally asked by Dr. Keeble if he would stand down, and an opportunity would be given him later. *He was never allowed another chance to speak.* Incidentally, Mr. Cowan, I think, was the only speaker in favour of the Bill, who obeyed the Chair, and spoke from the platform. I give a statement of fact, and leave honest unbiassed men to judge whether free discussion was allowed. The chairman admitted knowing very little about bees, but if he knew nothing of the duties of the Chair, he should not have accepted that position ; if he did know them, one would have been justified in expecting him to carry them out, without fear or favour. I agree with Mr. Bee Mason, that the conference, as conducted, was of the greatest value to those in opposition to this particular Bill.[†]

THE SUGAR RAMP.

May I advise those who are in opposition to the proposed Bill, to ignore the notices that have been sent out by the Ministry of Agriculture, stating they have "secured" a ration of 14 lbs. of sugar per hive. The price of this sugar will be 1/6d. per lb., and may be obtained anywhere at this price, in any quantity, without the tiresome and devious methods as laid down by the Ministry. This is the sort of thing one may look forward to, if bees have to be kept by Government methods, and by permission of the Ministry.

THE ALUMINIUM COMB.

Very few reports appear in the bee press regarding the use of the Macdonald comb, and the experiences of users of this comb during the present season would be interesting. I have noticed one peculiarity, where this differs from the all-wax comb, and that is the fact that the workers clear out the cocoon after the bee has hatched, leaving the aluminium as bright as new. This does not always obtain, as I have seen combs with the brown cocoons intact ; perhaps it may vary with different strains or races of bees. American correspondents have written complaining that the queens will not lay in the cells adjoining the strengthening wires, but I have not found this to be the case.

[†] We fully agree with Mr. Barratt that Dr. Keeble was to blame on his attitude, so far as the discipline of the Conference was concerned. But the more we study the proceedings of the Conference, the more we find that he was influenced by the overwhelming irregularity of the "majority" speakers, who did their best to convince the Chair that members of the opposition were a company of idiots. The Conference should have been presided over by a strong man of distinction in the science and practice of beekeeping and commanding the confidence of both sections. But, after all, the composition of the Conference was not to be admired.—Ed.

The Constancy of the Pollen-collecting Bee

By ANNIE D. BETTS, B.Sc.

Text books commonly make the statement that the bee keeps strictly to one species of flower while foraging. That this is not invariably the case, is known to most observant beekeepers ; but as few have the leisure to make an exhaustive study of the subject, the following notes may be of interest.

Many loads of pollen captured at the hive entrance will be found to contain, when examined microscopically, a few grains of "foreign" pollen. These may have been brought to the flower by flies or other insects that visit flowers indiscriminately, or they may have been scraped up from the alighting board in the act of capturing the pollen. Grains of anemophilous pollen (Beech, Scotch Fir, Grasses) also often occur in loads of other species at the time when they are prevalent in the air. But, in addition to these cases, true mixtures do occur. They are a small percentage of the total number of loads brought home ; not exceeding, and probably much less than, 6.75 per cent. (My specimens were collected with a view to securing as many mixtures as possible, so that the percentage—6.75 per cent—of mixed to pure loads examined is plainly much higher than it is in nature).

Mixed loads of pollen are of two kinds, which may be distinguished, for convenience, as S. (segregated) and M. (mixed) mixtures. In an S mixture the two kinds of pollen are distinct, the bee having begun to collect from one plant and then changed over to another ; a load with parti-coloured bands results. In an M mixture, on the other hand, the two kinds of pollen are mingled ; and the load is all of one colour, and can only be recognised as a mixture under the microscope. S mixtures constituted about 40 per cent of the 233 mixed loads examined [*]. Actually, the preponderance of M mixtures is greater than this ; for most of the S mixtures carried into the hive during the time of observation were captured (since mixed loads were being sought), whereas many of the M mixtures must have escaped notice.

Gradations between S and M mixtures occur, but are apparently not very common. Sometimes one part of an S load consists of pure pollen A, while the other part is mixed A and B ; or a load appears parti-coloured because, though both kinds are mingled throughout it, A preponderates in one part, and B in the other. Mixtures of three or more kinds also sometimes occur (the most observed was five species), but they constitute only 6.5 per cent. of all mixtures examined, and contain a much larger proportion of garden plants than the average (47 per cent. as against 18 per cent. for two-species mixtures).

There is no clear evidence that a larger percentage of loads are mixed in spring and autumn, when flowers are scarce. Indeed, it is not unusual, at any time during the pollen-season, to find mixtures of the two species that are the chief sources of pollen at the time ; so that, though scarcity of pollen may increase the number of constituents of a mixture (cf. the prevalence of garden plants in triple and quadruple mixtures), it is not the primary reason why bees mix their pollen. The weather also does not appear to have any influence on the proportion of mixtures noted ; but this matter has been insufficiently studied, and there is a suspicion that there are more mixtures in windy weather (on the face of it, a quite likely result, as a bee buffeted about by wind will be more likely to become confused).

Membership of the same natural order, or of the same floral class (in Müller's classification of flowers according to their insect visitors), or the possession of similarly-coloured flowers, seem none of them to be of any importance in causing bees to mix the pollen. Out of 218 two-species mixtures noted, we get percentages as follows :—

Natural order.	**Floral class.**	**Colour of flower.**	
17	21.6	20.6	Same.
65.6	54.5	47.7	Different.
17.4	23.9	31.7	Unknown.

As more of the "unknowns" are probably different than are the same, the statement is proved.

Without doubt, **the most potent cause of mixtures is propinquity.** In a small number of cases the constituent plants of a mixture may have been growing at a distance apart, but in the large majority of cases they are known to have been growing intermingled.

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[*] The observations referred to were made in 1908—1912 ; conclusions similar to those here stated, based on the 1910 work, were published in the **B.B.J.**, 1910, p. 455 ; see also **B.B.J.**, 1909, p. 334 ; and 1913, p. 33.

The hive bee has probably acquired her comparatively high degree of constancy gradually, and we may therefore expect to find differences in this matter between different races, and even between individual stocks. A comparison of the figures for a species of humble (probably **Bombus terrestris**) may be of interest. Out of 14 loads taken at the nest entrance, 6 proved to be mixed ; a total of over 40 per cent. (Half of them were S and half were M). Humble bees are known to be less constant than the hive bee ; the explanation usually given is, that the hive bee, being weaker, has felt more keenly the need of economising her time and strength, and has therefore acquired the habit of becoming expert in the " manipulation " of one kind of flower, and then remaining constant to it for as long as possible.

There are one or two traps for the unwary recorder of mixed loads of pollen that should be mentioned. The pollen of some plants varies in colour, so that parti-coloured loads are by no means necessarily mixed (see **B.B.J.**, 1913, p. 34 ; and **Bienenzeitung**, 1891, p. 171). Many plants have pollen of a colour totally different from that of the flower (**B.B.J.**, 1910, p. 456), so that the beginner, seeing a bee at work on (for example) Fireweed (**Epilobium angustifolium**) with **blue** pollen in her corbiculæ, jumps to the totally unfounded conclusion that she is visiting two species of flowers on one trip. This mistake can be avoided by noticing the colour of the anthers, as a rule.

In conclusion, to give credit where it is due, it may be mentioned that von Planta (to whom we owe the analysis of brood-food) was one of the first to make observations on pollen with a view to detecting mixtures. He cannot have examined many samples, though ; for he concludes that the bee is, for practical purposes, absolutely constant. He gives the percentages of the chief and subsidiary kinds of pollen in several loads ; that even his own data do not altogether support his conclusion is seen from the case of his Bee No. 3, where the two kinds were in the proportions of 86.5 and 13.5 per cent. (See **Bienenzeitung**, 1884, p. 206). To von Planta belongs the credit of having been probably the first to take pollen from bees as they entered the hive. He does not however give his method, except that he caught the bees, removed their loads, and set them free again. He puts the presence of "foreign" pollen down to the causes mentioned at the beginning of this article, or to bees rubbing against each other in the entrance.

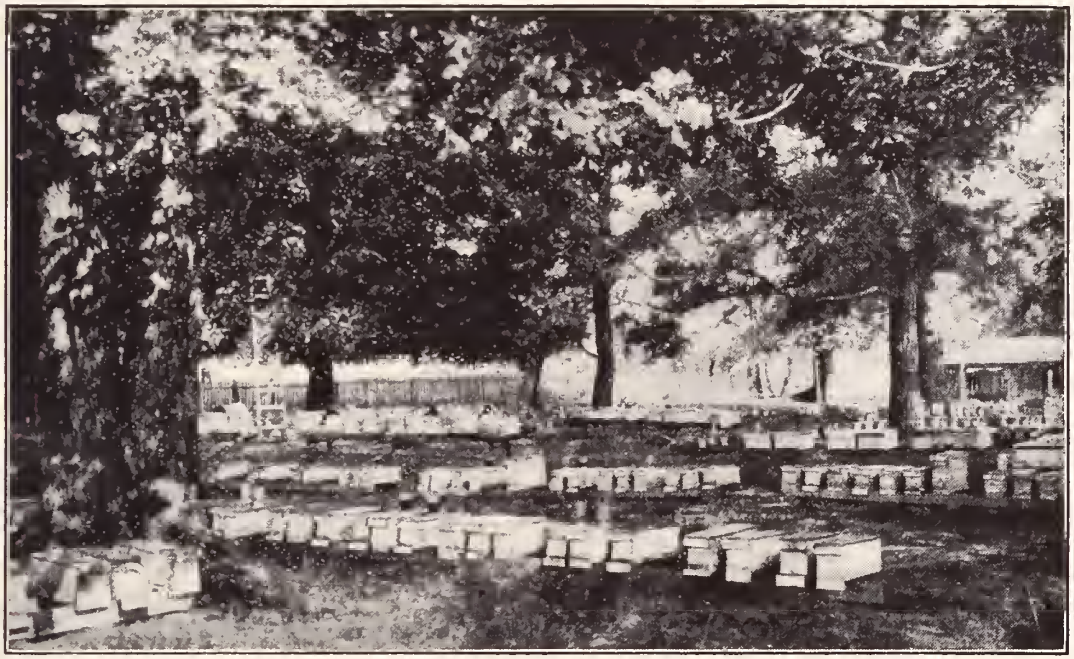


Fig. 2.—A corner of the Queen Yard, an Alabama Apiary.

In the foreground are individual mating boxes ; farther back are three-compartment mating boxes adapted from the usual Langstroth extracting super. The combined heat of three clusters gives the latter an advantage in Spring ; but, taken all round, the individual three-comb box is the more convenient.

An Alabama Apiary.

By JOHN PROTHERO.

To most Englishmen Alabama is a word of romance. It conjures up pictures of a land of cotton plantations, peopled by smiling singing darkies, mammies and Aunt Josephines in bright print dresses and Uncle Caesars with venerable white woolly heads. It recalls the tinkle of the banjo and the shuffle of dancing feet. It recreates the Southerner, the dignified courteous old gentleman, with long white moustaches, with oppressively elaborate manners and a super-elegance of deportment, whose pathetic but not unwelcome death about the end of the third reel is largely due to his unfilial daughter's affection for a massive, rough-hewn Yankee. I cannot claim to have lived in this romantic atmosphere. I am a queen-breeder, and to me Alabama means a nest of the largest and most modern apiaries in the world, conducted by those hustling, genial, clever and quietly independent young men who are the salt of America.

Let me describe the apiary in which I am at present working. It is a typical string, comprising about a dozen outyards and a central queen yard. The outyards act as feeders and also as guards; all black and hybrid bees are cleaned up within this area and if a queen should not mate with a drone from the central yard, she will hardly escape one from a neighbouring outyard. There are about a thousand hives distributed among these outlying yards, which are usually located near swamps and rivers, where there is an early spring flow.

In the early part of the season they are heavily raided for bees, brood, and honey; it would be impossible to maintain a queen yard of this enormous output without large and productive outyards as feeders. Later in the season they are permitted to concentrate on honey production, but their main function is to provide packages of caged bees for shipment to the north and to support the queen yard. In the spring, they are calculated to provide about three thousand pounds weight of caged bees and in the late summer from fifty to sixty thousand pounds of extracted honey. The outyards have their own staff of specialists, skilled in this branch of work; these have nothing to do with the queen-breeding department.

The heart and centre of the string of apiaries is the queen yard. I see in THE BEE WORLD, that Signor Piana is described as achieving in Italy " a record production " of queens in mating and dispatching six hundred a month. Here our daily graft is twelve bars of sixteen cells each, or nearly two hundred; we calculate on maturing seventy per cent., or eight hundred a week.

The queen yard consists of four types of colony, each performing a different function. Firstly, there are the breeding queens and drone colonies, picked from a thousand for industry, fertility, temper and colour-marking (the public insists on the standard brand); secondly, there are the grafting colonies, booming hives, kept at boiling-over strength, into which the newly-grafted cell-bars are placed for the first twenty-four hours; thirdly, there are the cell-building or incubator hives, into.which the cell-bars are placed on the day after grafting and where they remain until the day before they are due to hatch; finally, there are the mating nuclei, where the cell is placed to hatch out and where the young queen remains for about a fortnight, after which she is dispatched to Shanghai, New Zealand, Buenos Ayres, or, strange to say to Italy, whence her dingy ancesters came. There are twenty-four foreign countries on the mailing list of this apiary, but it is the eight hundred thousand American beekeepers who create the demand that keeps these great queen yards going.

To those who are already familiar with the routine of such an apiary I apologize for enlarging details already well-known to them. Practice, however, tends to vary. I have never yet found two apiaries with the same procedure, even in the same neighbourhood, where similar conditions have to be dealt with. Every breeder has his own methods or his own fancies, if you like it, " to which he attributes his success"; as an instance, I read an article by Mr. R. Whyte, in THE BEE WORLD, in which he says, " It is acknowledged, I think, that skep-bred queens are the finest procurable." From these variations, discoveries or fads, gradually emerge accepted practice. Queen breeding in America to-day is a very different thing from what it was in the days of " Swarthmore " Pratt and Doolittle. Some of their ideas have been rejected; others have been changed and amplified.

In this apiary we will have nothing to do with piffling matchbox nuclei. The mating nuclei are strong miniature colonies of three extracting frames (17⅝ × 5⅜), carefully maintained at full strength with bees, brood, and honey. As Signor Zanini points out in your columns, this greatly increases costs; so beware of buying in too cheap a market. It is quite possible to raise queens carelessly and cheaply at one fraction of the trouble and expense exacted by the best methods. Herein lies the explanation of Mr. Whyte's startling statement. Queens raised in skeps are predestined for royalty; they are consistently well fed and nurtured; they are thoroughly incubated in a large cluster; when hatched, they immediately receive attention from nurse bees of the right age. (And here let me say that we will have nothing to do with hatching queens in cages).

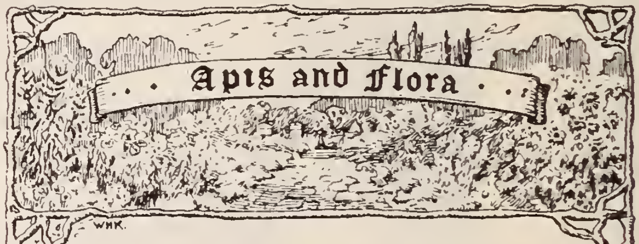
Artificial queen raising is a succession of pitfalls for the careless and slipshod beeman. How often with the light failing and rain approaching is one tempted to pick nice, fat, easy bugs? Why go back to the breeding colony and search out another frame? On the following day there are always a number of cells accepted in a half-hearted manner, which should not be passed on to the cell-building hives; this is where the trained eye of the experienced breeder comes in. Then, at the third stage, when the cell-bars are taken out, only long, tapering cells, ornamented as if the bees had taken pleasure in the job, are placed in the mating nuclei; stumpy and mis-shapen specimens are rejected. It is easy to see that there would be a living for a second-rate breeder in the refuse of a first-class apiary.

The type of frame exclusively employed in the queen yard is the extracting frame. Double brood chambers are used. The queen is kept on the ground-floor beneath an excluder; all the capped and hatching combs are kept here; the " bugs " are concentrated above, in the chamber which contains the cell-bars. This entails a great deal of continuous work and attention, but it is the key to efficient queen-rearing under the supersedure impulse.

A big honey flow always causes embarrassment in that the combs become clogged with nectar, thereby impeding the process described above. The supersedure impulse, too, appears to decline before the storing impulse, and heavy flows are usually accompanied by a fall in the percentage of good cells. A locality with a steady succession of moderate flows is therefore the best for a queen yard. The spate that brings joy to the honey producer is anathema to the queen breeder.

There is room for a lengthy treatise in discussing the merits and demerits of certain operations, and even then there would be no finality. You have to learn your locality, your honey flow, your weather, your temperature, means and averages, your strain of bees.

Fortunately beekeeping can never become stereotyped; individual skill, judgment, and experience will always find their scope and their reward. If genius be an infinite capacity for taking pains, then only geniuses should go in for queen breeding.



Even bees, the little alms-men of spring bowers,
Know there is richest juice in poison-flowers.
—KEATS.

The True Purpose of the Bee Garden.

By A. F. HARWOOD.

It is often remarked that " garden flowers do not yield a surplus " and with this observation the planting of flowers for bees is dismissed as a futility.

No one, I think, would ever claim that honey in bulk could be obtained from such sources, the only exception being in the neighbourhood of extensive seed trial grounds, where many flowers to which bees are partial are grown in large patches.

The statement, however, quite misses the point.

What is claimed for bee plants in the garden is:

1. That by a judicious selection such a succession can be obtained, that **all the year round** there is **something** that the bees can, weather permitting, work upon for nectar and for pollen.
2. That these sources lie quite near to the hives and are thus available even in circumstances when flights far afield would not be attempted or could not safely be indulged in.
3. That the presence of such flowers is, for the purposes of early brood rearing and maintenance of steady work within the hives, a substitute for slow feeding.
4. That the accessibility of nectariferous plants prevents the

bees from acquiring the habit of loafing, a thing otherwise often observable when no wide range of surplus-yielding plants is in season.

5. That, by observation of the bees working on such flowers, the beeman can tell which varieties and strains are the most active at any given time.

A mistake commonly made is the planting of a few specimens only of a particular plant. This is practically useless in most cases. There must be at least a display sufficient to be outstandingly distinct, otherwise they may be neglected even though of the best kinds.

Bold masses of recumbent and carpeting subjects such as **veronica repens, anbrietia graeca, arabis alpina, nepeta cataria.**

Strong clumps of the perennials: **aster** (Michaelmas daisy) **anchusa, heleniums, echinops ruthenicus, e. ritro.**

Beds of annuals: **reseda odorata, limnanthes douglassi, phacelia tanacetifolia, borago officinalis.**

Distinct rows of taller biennials: **e. sphaerocephalus, campanulamedium, cheiranthus.**

Frequently recurring specimens, unpruned, in the shrubbery of such subjects as **ribes sanguinea, symphoricarpus herberis, veronica buxifolia, cytisus** in variety, **genistas, buddleia variabilis.**

This is the style of planting that will convince the beeman of the beauty and utility combined in flower gardening for the bees.

The Press Mirror.

Much has been accomplished; more than people are aware—so gradual has been the advance. How noiseless is the growth of corn! Watch it night and day for a week, and you will never see it growing; but return after two months, and you will find it all whitening for the harvest. Such, and so imperceptible in the stages of their motion, are the victories of the press.—De Quincey.

Bienen-Vater.

SKEP BEEKEEPING.

Skep beekeeping is much recommended (p. 65) on the grounds of cheapness, simplicity, naturalness and suitability for the bees' requirements and ease of transport. A super with moveable combs is used.

FRAMES.

Austrian beekeepers are going in largely for "broad frame" hives (that is, with the longer dimension horizontal, as used here), as distinct from the deep frames, manipulated from behind, formerly—and still—used, owing to their suitability for bee houses. A form of broad-comb hive is described, which is manipulated from behind, and thus can be used in a bee house (p. 66).

ENLARGING THE BROOD NEST.

When placing a **drawn-out** comb into the brood nest it should be placed just where young bees are hatching; then the queen will lay in it at once. A **full sheet of foundation**, on the other hand, should go between the last frame of brood and the pollen comb next outside this (p. 69).

SALINE WATER PREFERRED.

Of two drinking vessels, that containing slightly salted water seemed to be slightly preferred by the bees (p. 70).

THE BEE WORLD.

(p. 74) "THE BEE WORLD, a monthly international bee periodical, edited by Dr. Abushâdy, at Benson, Oxon, England, made its first appearance in the world of beekeepers in June, 1919. If it adheres strictly to the programme of work it has set itself, and accepts articles without distinction of the nationality of the author, it will be useful also to non-English-speaking beekeepers, through articles translated into German, as was (in its time) the "**Revue International**" edited by Eduard Bertrand."

THE AMATEUR BEEKEEPER.

Certain professionals having spoken slightingly of the amateur, it is pointed out how much beekeeping owes to the amateur. Von Berlepsch (here credited with the invention of the moveable frame), and Von Hruschka (inventor of the extractor), were both amateurs. The writer concludes by quoting Von Berlepsch's well-known motto:—"Above all, learn theory; else you will remain practical blunderers all your life."

ARTEMISIA AS A SUBJUGATOR.

The account of Chinese methods given in THE BEE WORLD (Vol. 1, p. 182), is quoted, and it is observed that "If we had this kind of Artemisia, beekeeping would be a real pleasure, and the bees and their keeper would get on better together." [It may be noted that the species of **Artemisia** the Chinese use is **A. indica ***; it is hoped to make experiments shortly with **A. vulgaris,** the common Mugwort, to see whether this has similar properties].

EXCLUDING THE WAX-MOTH.

A skep standing on a sheet of tin suffered less from wax-moth than those on ordinary floor-boards. Possibly there may be an advantage in covering the floor-boards of hives with tin.

A DISADVANTAGE OF BEE-HOUSES.

When—as evidently sometimes occurs—the queen takes a short flight in Spring, she is more apt to mistake her hive (with fatal results) if the stocks are crowded together in a bee-house. There is evidence to show that cases of inexplicable queenlessness occur oftener when a bee-house is in use.—A. D. B.

DO BEES CARRY EGGS?

An incident is described in the July number, when this apparently occured. The beekeeper confined the queen to the front of the hive (arranged "warm way") on five frames, the remaining six frames being placed at the back of the hive with a queen-excluder division-board between. This was done on the 19th and 20th of May. On 16th June he examined the stock, and found, as he expected, that all the brood in the six back frames had emerged (save a few drones); but what was his surprise to find—besides a virgin, dead on the floor—a queen cell with a larva in it! No signs of any eggs on any of the six combs.

It is to be hoped we shall hear the subsequent history of this queen cell.

QUEENS TAKING A CLEANSING FLIGHT.

The same writer (p. 103-4) describes an instance when he lost two fertile queens (one a yearling, the other two years old) in this way, findng them lying in front of his apiary on 29th March last, after a good flying day. On inspecting the queenless stocks, he found eggs and brood in all stages, and no sign of queen cells.—A.D.B.

L'Apiculture Francaise.

In "**L'Apiculture Francaise**" for May, the editorial contains a notice of the beekeeping convention which is being organised by the "Orleans" Railway Company: an account of a visit to Correze where skep beekeeping is extensively practised: and a note on the advantages of co-operative buying. There follow notices of meetings of the "**National Federation of French Beekeeping Societies**" and of an exhibition to be held at Metz in the autumn. The "Doctrine Apicole" includes a description of the Dadant-Blatt hive: an article on the superiority of honey over sugar given below: another on the prevention of propolisation and a third on some difficulties experienced with unsealed nectar. Then comes the "Directoire Apicole" giving practical seasonable advice: correspondence and notices of books received.—Graham Burtt.

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*See "**A Residence among the Chinese**" p. 114.

HONEY AND SUGAR.

It has always been that beekeepers and their journals have asserted that as food, honey is of greater value than sugar. But unfortunately they very rarely give evidence in favour of their opinion, and critics do not hesitate to say, or at least to think, that they proclaim the superiority of their product because it is to their interest to do so.

Here then are some definite facts which go to show the possibility and even the probability of putting to the proof that honey is worth more than sugar.

It lies in the discovery of " vitamines." It has been known for a longtime that sailors of past times, reduced for long periods to subsisting on dried foods, were subject to scurvy. This malady disappeared only when the patient could get fresh foods and vegetables.

It is also known that new-born children fed only on sterilised milk (as a precaution against microbes) are subject to infantile scurvy, and that this too can be cured by giving the child **fresh** milk.

Again, in the Far East the people who live only on rice are liable to a special disease called beri-beri, and that this disease can be cured by feeding the patient on other foods or even on finely ground rice husks.

The learned men have thus been brought to enquire if there is not in fresh milk and green vegetables a part which is destroyed by sterilisation, and which is necessary to the normal development and conservation of health of the human body.

Their researches have led to the discovery of products which are present in fresh foods in excessively small quantities, but which are however absolutely necessary to life.

To these they have given the name of " vitamines."

From the beekeeper's point of view, the question presents itself thus: Sugar is a chemically prepared product, absolutely pure. In the course of its preparation it has undergone a series of processes: filtration in the presence of animal charcoal: boiling in the presence of lime: etc., etc., processes which would certainly destroy any vitamines it possessed.

Honey on the other hand is gathered from the flowers by the bee and carried to the hive. If it contains vitamines they will still be present.

Let us hope that our scientific beekeepers will direct their attention to this matter, so that they may be able to announce " **Honey Contains Vitamines.**" This will end the controversy by a definite victory for honey.

L'Apiculteur.

THE STANDARDISATION OF FRAMES.

" **L'Apiculteur** " for May, devotes its leading article to a plea for the standardisation of frames. There are three main varieties of these used; the Dadant-Blatt, the Voirnot, and the Layens: but it is the **inside** measurements that are standardised, the outside varying according to the thickness of wood used and so impeding interchangeability.

There are also articles on the training of disabled soldiers, for which purpose a number of schools have been started in various parts of the country: on the detection of adulteration of honey: on the care of an apiary during June, etc.,.followed by extracts from other journals and association reports.—G. B.

SCHOOL BEEKEEPING IN CANADA.

The most interesting report furnished us (from Canada) is that of a school of Roberval, which is under the direction of the Dames Ursulines.

	Hives Spring count	Honey (French) lbs.	Crop Wax lbs.	Propolis lbs.
1910	2	40	—	—
1911	4	120	6	—
1912	12	428	8	—
1913	19	2,000	25	2
1915	16	1,756	34	3
1916	22	3,740	43	2
1917	19	2,167	31	3
1918	21	3,972	52	4
1919	22	4,020	48	3

The average crop from 22 hives in 1919 was 1,827 lbs. of honey per hive, 4,020 lbs. of honey at 30 cents yield the sum of 1,206 dollars. A very striking record.

At an exhibition held at Roberval in the Autumn of 1919, the " Dames Ursulines " carried off the most part of the first prizes not only in honey but also in vegetables, fruits, corn and even live stock, a record which should put some of our smallholders to shame.

L'Apicoltore.

THE ECONOMICAL PRODUCTION OF EXTRACTED HONEY.

In the June number of **L'Apicoltore,** the editor, Dr. Asprea, makes an interesting suggestion towards the reduction in the cost of producing extracted honey. The idea is to get the bees to construct and store the surplus in one-sided or unilateral combs, and thereby save the apiarist's time in uncapping, in extracting and in waste in the form of the capping and honey mixture which costs time to separate and render.

Bees will not ordinarily build comb on one side of a natural or artificial septum, and Dr. Asprea suggests that the fully constructed but empty combs be cut from their frames and pushed through the latter until the midrib lies flush with the edge or side of the frame. The cell walls on that side on which the comb projects are then shaved down to the midrib surface. The frames containing these one sided combs are now ready for the bees and are hung in the rack in pairs back to back, so that there is not more than a bee space between the midrib faces of each pair. Disposed thus, the bees will, after making all secure, start to store in the cells on one side of each comb, and, as they are filled, will lengthen the cell walls as is their custom. If suitably spaced these extracting frames having but one side can be made to contain as much honey as an oridnary two-sided comb of the same area.

This is quite a feasible and practical suggestion which is worthy of trial by all those who go in for the production of extracted honey. Metal foundation or wax foundation suitably attached to 3/32" three-ply wood nailed to one side of shallow frames are alternative suggestions which naturally suggest themselves, although I believe that the suggestion of the originator of the idea of the unilateral comb for extracted honey would be the most attractive to the bee. —H. M. Stich.

The Beekeepers' Record.

" JULY THE DELUSIVE."

By J. H. H.

This is the third season in succession that July has proved a disappointing month, and, instead of being, as I used to be told at school, one of the hottest months of the year, it has, on the whole been decidedly cool, with frost on at least one night in the more northern parts of the country. Those beekeepers who have been making increase must give the newly-established colonies, either swarms or nuclei, special attention—first, to see that supplies of food do not run out and the bees starve, and, secondly, that virgin queens in nuclei succeed in mating. In some districts even well-established stocks may be suffering for the want of food.

There is still a fair amount of clover about, and late varieties of lime and blackberry are in bloom, so, if August will only give us warm weather, some surplus may still be stored from those sources, and there may be a chance of decent surplus in the heather districts.

The British Bee Journal.

APIS CLUB CONFERENCE IMPRESSIONS AND A SUGGESTION.

By L. W. Walton.

Considering the far-reaching range of **The Apis Club** and the newness of its constitution, the attendance at the first annual conference at the Central Hall, Westminster, on the last Saturday afternoon in May, was not altogether disappointing; many members having travelled long distances to be present at the initial meeting, with an eagerness that betokens enthusiasm and keen interest in the welfare and future proceedings of the Club.

Yet it must be acknowledged that the rate of one out of every twenty is a very meagre proportion and members should look to it, and feel that their presence, even if their voices are silent, is required at the next meeting, whenever and wherever that may be.

The gathering was certainly to be congratulated in having in its midst, such an able and capable chairman as Mr. J. B. Lamb, to preside over their meeting, and the fullest confidence of all present went with the representative committee elected towards the close.

As may be imagined, from the commencement the whole of the proceedings were centred round and dominated by the financial affairs of the undertaking, which, when made known, put aside every other consideration for the time being; and the members were visibly nonplussed by the overwhelming task Dr. Abushâdy had borne with such perseverance and with such inadequate support for a whole year in bringing forth that finest publication in beedom—THE BEE WORLD—apart from the enormous work in the formation of the Club.

One very cheering note was the fact that new members were still being enrolled, and at the average rate of two or three every day; and on reviewing the discussions the writer feels that this fact is an extremely hopeful foundation to build upon, and he would like to make the suggestion that his fellow members do their utmost to encourage and increase this enrolment if possible, by each canvassing his or her beekeeping friends with a view to inducing them to join. Lend them any copy of THE BEE WORLD (they are too precious to give away) for their perusal, if they have the craft at heart, a glimpse through its pages will be sufficient inducement; in this way, we can swell the membership and thereby greatly encourage the work of the representative committee authorised by the conference in their deliberations with the founders.

We have hitched our wagon to a star; our aims are high and noble, and we cannot retract or reduce them. But their attainment can only be fulfilled by each doing his share, and that for the moment seems to be to help to swell the numbers.

We cannot do less.

Bee Craft.

THE DEVELOPMENT OF THE APIS CLUB.

By Gilbert Barratt.

Your earnest appeal for the development of **The Apis Club** should be appreciated by every British beekeeper who finds in the principles of this institute the salvation of the industry from the retrogressive influence of party strife. I sincerely share with you the hope that " Kent is well to the front in the membership roll of the Club."

The Apis Club or Institute, so called so as to denote a fraternal federation of beekeepers everywhere, stands for a wide and broad-minded progressive movement based on research work, on inspiring education, on co-operative help, and on cementing friendships amongst apiarists of this and other countries for the benefit and advantage of all.

A visit to the offices of the Club, and an examination of its files and books, to which any member is entitled, have clearly demonstrated to me with what impartiality and full democratic spirit, with what perseverence, and at what heavy and almost unbelievable sacrifice the work has been conducted in order to bring it to a successful issue. The best supporters of the work have not escaped candid criticism in the official organ of the Club, whilst those who have, through misunderstandings or otherwise, stood aloof or opposed its growth, have always received their full measure of appreciation where and when due. I do not know of any association which is consistently growing at the steady rate as revealed by a scrutiny of the membership book; nevertheless, this needs to be enormously increased in view of the gigantic scope of the work, the fruits of which are bound to return to the whole of the craft. A day or two ago there appeared in the Press an announcement that over 13,000 persons had applied to the Ministry of Agriculture for Italian queens. At a conservative estimate, based on this statement, there are at least 20,000 beekeepers, or prospective beekeepers, in this country; if only half this number supported this cause, the result would be a triumphant success. **The British Bee Journal** fittingly emphasised this by remarking that " the questions involved deserved the immediate consideration and support of all our associations, not in the form of resolutions and letters of sympathy, but by tangible co-operation. International apiarists abroad can see for themselves the advantages of the independent and powerful development of **The Apis Club**. Only by devoted co-operation and the enthusiastic recognition of a dutiful service towards a free ideal aiming at the regeneration and uplifting of the craft can such success be achieved."

You have most admirably exposed the leading principle of this public work in your remark, " the nearness of our home county interests must not obscure our view so much that we see no further than Kent, and the large field where our main interest ultimately lies. The advancement of beekeeping is our aim, and Kent is merely the little spot in which we find opportunities for utilising our energies. The disadvantages of insularity are too evident to need much emphasis, and membership therefore of an all-embracing Bee Organisation is as necessary to us as the open fields are to our apiaries."

The voluminous amount of moral support accorded to the work from all lands, the amazing number of complimentary letters received, as exposed by even a brief examination of its files, and the great appreciation shown by many leading men everywhere, have never been brought to light, Dr. Abushâdy rigidly adhering to the policy of principles before personalities in gaining support, yet it is amazing how small is the financial aid given to the work in comparison with the literary and moral support given. The scope of the scheme, even in its present infancy, needs the active co-operation of a band of enthusiasts, let alone one man in the person of its founder. If a full year of tenacious activity and self-denial, for the serving of such an ideal is not enough as a basis for the greater activity of the British beekeeping public, from its leaders to the rank and file, then apiculture is in a hopeless case, bound fast in apathy and selfishness, and unlimited faith and self-sacrifice go for naught.

I have trespassed too much on your valuable space, Mr. Editor, but I consider this public work, although no more than a year old, of such a great national and international importance, that if it has already merited the repeated review of the leading bee press of five continents it should be equally worthy of the most liberal publicity and support of our home press, so as to bring it to a triumphant and permanent issue. It should be the pride of Britons that the **Apis Club Movement** was started in this country, and principally for their benefit; in that spirit their whole-hearted support should be given. So far as Kent is concerned, I hope your genial leadership will suffice.

The Beekeepers' Gazette.

LEGISLATION.

By A. Z. Abushâdy.

It strikes me, Mr. Editor, although I do not agree with several of your remarks on the subject of bee diseases legislation, that you are trying to prove the obvious. Dr. Keeble admitted that he practically knew nothing about bees, and he even spoke of the " Bacillus " **Nosema Apis.** I fail to see why uncharitable explanations should be, therefore, advanced in the first place for the circumstances of the London Conference. The supporters of the Conference openly declared that after all persuasions this was the best concession that could be obtained from the Government, and as they believed in the realization of a workable democratic scheme, they felt satisfied with the first step. Personally, I think they were wrong, and that by a united effort and a better understanding amongst the Craft, the Government could have been made to realize their duty and to show a little more respect to the Craft. The constitution of the meeting in principle was wrong; and in form it could hardly be described therefore as a " packed " meeting in the objectionable sense. But as the principle was wrong, the whole meeting was not to be admired. Only no protest was made, unless, of course, those who were prevented from speaking meant to protest. The Chairman of the **B.B.K.A.** did not fail to say at the beginning of the meeting that no mature judgment could be made at such a short notice. His courteous protest should have been candidly enforced by others. Again, when Mr. Barratt withdrew, he was not supported by those who professed to share his opinion. The delegates themselves were as much to blame as anyone else. The majority delegates, with few exceptions, assumed such an attitude that the Chairman, who was evidently selected for his impartiality, was led to believe that the minority were totally composed of unreasonable people, who did not know what they were talking about, and merely wanted to hinder the proceedings. Do you wonder, therefore, that with his admitted superficial knowledge of beekeeping, he considered that any references to queen rearing had no bearing on bee diseases and legislation? I quite understand that he sincerely believed in his impartial attitude. It is not correct that

I was not deputed to the meeting. I was asked to attend it (48 hours previously) on behalf of a County Bee Committee. When I asked for a mandate, there was none. When I inquired about the exact nature of the Conference, I understood that the Committee knew no details. At such a very short notice, and bearing in mind the fact that as editor of a bee magazine of no small circulation, as an organizing secretary of a beekeeping federation with a membership in excess of at least three or four of the associations represented put together, and as chairman of a business house, I was more entitled to a direct invitation from the Ministry of Agriculture, and therefore I did not care to attend; and I am thankful indeed for that decision. But as the Government have ignored the Trade, the Press, the Colleges, and everybody not labelled "Association" and yet committed the mistake of being generous in inviting some opponents to legislation, who, on the basis of the Conference, had no right to attend—I certainly have no special right under the circumstances to complain alone. This is not a question of personalities at the present stage, but of whether the proposed Bill as it stands sufficiently safeguards the interests of the Craft, or otherwise. In my humble opinion it places the Craft entirely at the mercy of the Government. I attach no importance to guarantees which are not incorporated in the Bill.

[In a subsequent number of the **Gazette** the following comments appear by J. R. H., Oxon: "Dr. Abushâdy does not contribute much to a solution. He blows hot and cold, and excuses everyone except the opposition. According to him, the scandalous treatment to which the opponents of the Bill were exposed was not the Chairman's fault, but their own. I fear we cannot hope for much help from the doctor. The question is: what is being done by anyone to oppose the Bill in Parliamant? Thousands of beekeepers-for-profit are agreed that the Bill will wreck them if it passes. It is time for them to prepare. The Bill may be introduced at any moment. What are our leaders (who saved us before) doing now?"

J.R.H. may rest assured that it is far from our ambition to hold a banner for him and his friends. At the same time we fail to see why we should merit a glaring misinterpretation of our views on bee diseases legislation. Scores of letters of appreciation in our possession from distinguished beekeepers of different sections testify to the fact that, true to our professed principles, we have not failed to give an impartial exposition of the whole situation and thus cleared the atmosphere of misrepresentations and insinuations. Our costly space—apart from our motive—will not permit us to utilise this magazine for commercial egotism and cheap advertising and the occasional publication of extracts from appreciative messages and articles in the press is purely meant as a token of gratitude to our generous friends, since we are perfectly aware of our imperfections. We are in no need therefore of giving a display of the testimony of beekeepers to the service which this magazine has rendered in regard to legislaton.

It is absurd to suggest that we did not blame Dr. Keeble. But we consider that most of the majority delegates were deserving of blame and not less deserving were those opposition delegates who did not show sufficient courage to join Messrs. Barratt and Silver in their protests. A member of the opposition, for instance, was more interested in canvassing the principles of his re-stocking scheme than in protesting at the treatment accorded to Mr. Barratt.—Ed., B.W.]

The Irish Bee Journal.

EXTRACTED HONEY.

By Ernest Eaton, Expert, B.B.K.A., Cheshire.

It is now generally admitted that a colony will produce twice as much extracted, as comb honey, and when it is considered that the former if fully ripe when removed from the hive, will keep any length of time, and that sections are apt to weep in cold weather, and also to crystallize and consequently become almost unsaleable, the advantage of producing extracted honey is preferred by many.

To visit a successful bee-farm at the time of deprivation, where extracted honey is worked for, and see the tiers of supers containing honey, creates an imperishable impression on the mind. There are districts, however, where sections are almost unknown, and the beekeeper should endeavour to obtain his harvest in the form in which it is demanded locally.

Two facts must not be lost sight of in producing honey in any form: First, nothing but the most powerful colonies will give satisfactory results; and in order that there may be no misconception as to what a powerful colony is, it is well to state that the constant stream of traffic entering and leaving the hive appears to block the entrance and the air resembles nothing so much as a hail-storm in progress. Secondly, that the improvement in queen rearing has been so marked that the ordinary single brood chambers are found insufficient to accommodate the increased fertility of many queens. Provided that a young and prolific queen heads a stock there will be little difficulty experienced as regards strength if properly managed, and the following plan may be worked.

As soon as the brood chamber is completely filled with bees and brood and the honey flow is commencing—which is evidenced by the bees falling heavily on the alighting board with distended bodies, and the whitening and extending of the cells next to the top bar of the frames—a shallow super of worker foundation, or a second brood chamber, should be placed under the brood nest and, after first placing the queen excluder over the brood chamber, another shallow super should be placed above the excluder. The one below will at once be taken possession of by the queen for eggs and utilized to the capacity of the queen's fertility. The bees thus obtained in the height of the season will rapidly fill the combs of the one above with honey, which may be removed and extracted as soon as completed, and returned to be re-filled; or further shallow supers may be given, and left on the hive until the close of the harvest. Care must be taken to prevent the escape of heat at the junctions between badly fitting supers, and this may be accomplished by inserting lengths of folded newspaper, or pasting slips of paper over the crevices.

If there is any doubt as to the strength of any colonies they should be worked on the doubling plan. Greater harvests are secured by this plan than by any other. To double, all that is necessary is to remove the inferior queen and, if it is found desirable to preserve her, make a nucleus on the old stand, placing the hive and its contents bodily upon the other making a double chamber which, by the hatching above and below, will soon teem with life, and this enormous population will fill the upper storey with honey, which may be extracted as often as desired, or left on until the close of the season.

The nucleus should consist of one frame of brood and bees, and two empty combs, as a proportion of the bees from the doubled portion will return to the old stand and strengthen it.

The union of the two colonies enables it to place a larger force of honey gatherers in the field than would have been possible if left singly. This method involves additional labour, but it has many adherents, as swarming is checked with tolerable certainty by obviating its greatest incentive, viz., completion of brood nests. There is no loafing, the energy of the bees being directed to storing surplus, consequently there is a much greater yield of honey.

The American Bee Journal.

COSTLY MISTAKES.

By F. Greiner.

How often have I wished that I might be in a position to begin my life work with bees over again, how I would try to avoid the many mistakes made during this period of slow learning. Why cannot those who are coming on now profit by these mistakes made by us? The great mistake I made in younger years—and I have not outgrown it now— is that I had too little faith in the business. I was afraid to invest capital in it—borrowed capital, if you please. This timidity manifested itself in various forms. For instance, it cost money to purchase comb foundation to fill the brood chambers of our hives; but what of that? Would not a colony of bees be in much better shape for years to come with a set of all worker comb? Certainly it would, and the bees would repay in a very short time this expense. To raise comb honey without the use of full sheets of extra light section foundation would be the height of folly. None of that for me any more, although I have "economised" in this fashion for years.

A great many bees, and colonies of bees I have lost during winter by not giving them enough protection. The first book I ever read on beekeeping, written by Fr. Dzierzon, I found the advice given to "protect the bees by packing," but it was expensive to build winter cases or double-walled hives, so we got along for years without protection, and most always lost heavily during the winter. These losses, if expressed in dollars, would have bought the timber for ten times as many winter cases or chaff hives. The present method of outdoor wintering demands very heavy or thick packing. Winter cases providing for 8 or 10 inches of packing cost lots of money; but let us suppose, for the sake of the argument, that the cost of a four colony packing case would be 10 dollars. If we have done our work well and have our colonies in the best condition in the fall, with sufficient stores in the large hives, we will have four rousing colonies of bees when May comes. Each one of these colonies will be better than four ordinarily wintered colonies and, as one of my friends says, may pay the cost of packing case the first year from the fruit bloom alone. But should the weather be unfavourable during this period, we may divide each colony and then have a better lot of bees to gather the clover honey than we would have had we wintered ordinarily. Our crop would be sufficiently greater to pay for our packing cases twice over. Packing cases with lots of packing are one of the best investments of the beekeeper. Many of us do not know what well wintering means; many of us are pestered with poorly wintered colonies, year in and year out. We should do better; it is business.

The third mistake a beekeeper can make, which almost soured my whole nature, is to be contented to carry on beekeeping in a poor honey location. My young friend, get out! There are many good unoccupied fields; find one and stock it up to its full capacity. You will be better off financially.

Gleanings in Bee Culture.

OUR MANNER OF HANDLING QUEENLESS COLONIES.

By Wesley Foster.

In running for extracted honey every producer, I think, has the experience of finding, each spring, quite a number of colonies that are queenless. We know this is our experience, and when attending to our queenless colonies we think it does not pay to try to requeen them; so they are simply united with other colonies, and a sheet of paper is placed over the colony with which the queenless colony is to be united, the latter being set on top and a small hole punched through so the bees can work their way through in a few days. Our time in the spring is too valuable to spend in trying to introduce queens to these colonies.

We rear only a small part of the queens that we use, as we find it is more profitable to have all the queens ordered from the Southern breeders; and by the way, we always order two or three times as many as we need, thus coming nearer getting what our requirements will be than if we should order just what queens we thought we should need. We have had the experience running over several years, that queen breeders are never able to fill in full all of the orders that they are given, especially if a very rigid time limit is placed on the order; so we find it pays better to order heavily and then we can let some of the other beekeepers have the extra queens if we get more than we need. We order quite a number of virgins and re-queen with them, the virgin queens being mated in the colonies where they are introduced. This saves the beekeeper a great deal of time and is practically as good as mating the queens in nuclei, for which we have little time.

The Domestic Beekeeper.

THE DEMAREE PLAN FOR HONEY PRODUCTION AND INCREASE.

By Hy. W. Handers.

I think it is the best one for the production of extracted honey and the making of increase—though I suppose that for the latter purpose it should be called the Alexander plan. If there are any beginners reading these pages let me explain. The plan consists of placing the queen with one or two frames of brood in the bottom box, than giving frames of comb or foundation to fill the rest of it. Above the brood chamber thus fixed is placed a queen excluder, and over that the brood. Sometimes a super is put between if honey is coming in well. The brood hatches out above and the cells fill up with honey, while below the abundance of room given stops all swarming. One of the great advantages of his plan is that for purposes of increase the brood above may be kept a week or ten days on the original hive until the larvae have all passed into the pupa stage and need very little attention. Now if a couple of frames of this mature brood is taken and placed in an empty hive with a queen cell or queen, and the entrance closed by stuffing it with grass, a new colony is made at little expense in either honey or work. The bees will get out as the grass withers and they can well be let alone for a couple of weeks, after which they will probably be found with a comb or two of brood and a young laying queen. Now give them one more comb of maturing brood, and if the season is still young they will be a fine big colony for winter. If the season is advancing give them another frame in a week later.

The Western Honey Bee.

QUEEN REARING.

By A. E. Crandall, Berlin, Conn.

The success or failure of a colony of bees to produce the maximum amount of honey depends in a large measure on the queen. Of course the locality, flow of nectar and management of the colony are all factors having their influence; but even if these factors are all present, a poor queen will undo everything.

To begin with, we must have first-class pure breeding stock, and in making the selection of our breeding queen it is well to know the history of the parent stock if possible. In striving to produce the best of queens, we look for the colony producing the largest amount of honey, also taking note of the colour of the queen, bees and drones. We want stock that has proven to be hardy, resistant to disease and not given to the building of burr and brace combs. The queen should be very prolific, and we prefer one that is long and slender and about of medium size. The largest queens are not always best. If comb honey is produced exclusively, then the breeder should select a queen whose bees make nice, straight combs, that are capped white, and avoid anything that looks like a watery capping. After we have selected our breeder, we are ready to prepare one or more colonies for starting and finishing cells, depending on the number of cells desired.

Select a good strong colony, take away the queen and all the brood (queen and brood with a few bees left on the combs can be placed in another hive body and set over any colony with excluder (?) between, and used later for various purposes), go to another strong colony that can spare plenty of bees, select two combs well covered with bees and shake the bees off the combs in front of the cell starting colony. Many of the older bees will return to the stand from which they were taken. leaving the younger bees to crawl up into the hive, which they will easily do if the hive rests on a stand near the ground and has a sloping board in front. The idea is to have the cell starting colony supplied with thousands of young nurse bees that will go to work on cells as soon as they are given.

Combs containing plenty of honey and pollen should be supplied, and if no nectar is coming in, feeding should be begun, so that the bees will at no time feel a shortage of stores. For best results the colony should be placed in as prosperous a condition as we can make it.

The colony is left queenless and broodless for 24 hours and if cells are to be grafted, 30 or 40 cell cups are given and allowed to remain with the bees for a short time to allow them to clean and polish them before the grafting is done. We then select a comb of eggs and larvæ from the breeding queen (which is kept in a nucleus), brush all the bees off carefully with a few weeds or wisps of grass, get the cells which are now cleaned and take comb and cells into a warm room if it is cold outside. Royal jelly diluted with warm water to the consistency of cream is used in grafting, but is not always necessary with this method. A very small quantity of jelly is placed in the bottom of each cell cup and larvae from 12 to 24 hours old are lifted out of their cells and gently placed on the jelly.

The operator will need to have good eyesight and a steady hand. Quills, tooth-picks, twisted horse-hairs and grafting needles, which are sold by supply dealers, are used in the work; but whatever tool is used it must be so made and handled in such a way as not to injure the larvæ in any way.

For those who are not confident of their ability to handle larvæ in this way, the method of cutting combs containing eggs or larvæ into strips might appeal to them. A new comb or full sheet of foundation is given to the colony or nucleus containing our breeding queen. After the queen has laid quite a few eggs and they are just beginning to hatch, the comb is ready to cut into as many strips as we think we will need. Each strip contains one row of cells which are shaved down half way with a hot knife; every other larvæ is lifted out to make room for the cells which are left to develop, and make their removal an easy matter; then the strips of comb are fastened with melted wax to bars made to fit whatever style of frame in use. Two bars of these cells, and sometimes more, are given; much depends on the strength of the colony.

Records of all proceedings must be kept and followed closely in order to determine what day the queens are due to emerge. If a small number of queens are wanted, the bars of cells can be left with this colony until they are completed or even until the tenth day, at which time they should be removed and placed in nursery cages or given to mating nuclei. We often leave them until the morning of the eleventh day if the weather looks good. It is nice to have cell building colonies in a building or open shed so that the work can go on regardless of weather conditions.

If queens are to be reared in large numbers for the trade, the grafting method seems best, and all cells accepted by the bees can be removed the following day after grafting and placed in the top storey of a two-storey queen-right colony having a young vigorous queen, keeping her in the lower storey by placing a queen excluder between the two hive bodies. Brood should be lifted from below and placed in the top storey, care being taken that the queen is not placed above; then the bar of cells can be placed in the centre of the hive body between the frames of brood and if the colony is a powerful one, or made so by the addition of bees and brood from other colonies, the cells will be well fed and kept warm and we can look for the best development of queens handled in this way. With extra strong colonies we sometimes place a shallow extracting super, filled with frames of foundation, between the two stories, as during a heavy flow of nectar this gives the wax bees something to work on and keeps the cells from being engulfed in comb. After the first lot of cells are removed from the queenless colony, a fresh lot of cells can be grafted and the same process kept up from day to day. The number of cells we want would depend on the number of orders we have to fill; and it is best to allow for accidents or other troubles which are apt to show themselves, as the path of the queen raiser is not always strewn with roses, by any means.

Whatever method we use in getting cells, after they reach that stage of development where they are nearly ready to emerge, we must be ready to care for them. Some breeders place all the cells in nursery cages supplied with candy made from confectionery sugar and honey, or a fondant. In this way they are able to sort out any queens that are defective in any way, and then place the best in any style of mating hive which they may happen to use. In giving cells direct to mating colonies, the cell should be placed in the warmest part of the hive, where it will be taken care of properly, or the resulting queen may be two or three days late in emerging and be dark in color.

With the method of giving cells to mating colonies, the colony should be examined soon after the queen is expected to emerge to make sure that she is properly developed and normal. Giving virgin queens that are a day or less old has given the writer as much satisfaction as any method yet tried. We have tried all styles of mating hives, some having large frames, shallow frames and another style of hive having a small frame 8 × 5⅜, 20 of which will go in a shallow extracting super, the super having a division board placed inside at the centre for a frame rest. These supers when filled with these little frames and full sheets of foundation in them, can be placed on any strong colony that will work in a super and the frames will soon be filled with combs and honey and these combs are then ready to be used in the mating hives. Our mating hives hold from 4 to 6 of these frames.

In starting these mating hives we give one full comb of honey and two or three empty combs, as we have found this number sufficient for a starter; then about a pint of bees, which have been brought from an out-yard, are shaken into the mating hive and the entrance closed. The hive is then taken into the cellar or other cool place and left for eight or ten hours, after which a virgin queen is taken from a nursery cage, the hive given one or two gentle puffs of smoke and the virgin run in. If bees are to be placed in the mating hives in daylight, it is best to sprinkle them with water; but if we do the work at night, which is often the case, we do not sprinkle them at all, just scoop them out of the cage they are brought home in, and put the desired quantity in the mating hive.

The cage of bees is given a few shakes and then the bees are easily handled, as it demoralizes them somewhat, as there are often bees in the cage from several colonies they hardly know where they are at. In shaking bees into cages we use a large funnel which is two feet long, the small end being three inches in diameter and the large end eighteen inches. If there is much nectar coming in the bees should be brushed off the combs with a few weeds or long grass or they will be almost drowned from the amount of nectar which will fly out of the combs.

The mating hives are allowed to remain quiet for a few hours after giving the virgin, before being placed on the stands which they are to occupy; and after being placed, the entrance is made small, so that the bees can more easily protect their home against intruders.

We must have thousands of pure drones in our mating yard, reared from our best stock, to insure pure mating; and to get plenty of drones and be able to control the amount of drone comb, to a certain extent, we cut a sheet of worker foundation in half and place one-half in a frame, then place the frame into the centre of the colony from which we wish to rear drones, and if the colony is strong and nectar coming in when the frame is put in, the bees will draw out the foundation and fill the empty half of the frame with drone comb. The queen will shortly lay eggs in the comb and in fact we have had queens lay in drone comb, just started and no larger in size than a silver dollar. Plenty of such combs can be kept on hand for use as wanted and if the top bar is painted with some bright colour as a sort of distinguishing mark, it will then save time in hunting them out, whether they are in the hive or stored among other combs. With the selection of good breeding stock, thousands of nurse bees in our cell building colonies, and never allowing the bees to feel the pinch of hunger, the best of queens can be reared.

The Beekeepers' Item.

SOME INTERESTING DATES.

It was in 1873 that the one-piece pound section box for comb honey come out, to be closely followed by the advent of comb foundation in 1876. This made possible a complete revolution in beekeeping in favour of section comb honey production, and resulted in a period from 1873 to 1906 that is known as the comb honey era. It was the principal product of the apiaries during that time.

The Federal Pure Food and Drugs Act of 1906 made possible what then became known as the extracted honey era. Previous to this excellent legislation in favour of beekeeping, producers of extracted honey were seriously handicapped by the unscrupulous and tremendous extent to which adulteration of this product was carried on over the country, and not until this relief came were beekeepers able to make extracted honey production profitable. Since then this kind of honey has been constantly on the increase over comb honey in pound section boxes.

Bulk comb honey, strictly a Texas product, found its beginning in 1894, as more profitable than section comb honey, which it replaced almost entirely in a very short time in this State. The change was made primarily necessary because of the long distance hauls and hot weather conditions which resulted in too many shipments of this delicate product being damaged in transit to market. Packing the comb honey in tin containers solved the problem of furnishing comb honey for which there was a great demand. A strong demand continues in spite of the fact that much agitation against it and in favour of extracted honey has been brought to bear on both producer and consumer. The fact remains, however, that a certain class will demand comb honey and will not be satisfied with honey in the extracted form. For this reason there continues to be a good market for bulk comb honey.

The California Honey Bowl.

QUEEN INTRODUCTION AT HIVE ENTRANCE.

By E. J. Atchley.

Turning queens in at the entrance is a bad policy and unless there is a good honey flow on, so there is no need of quarrels, it will be risky to turn queens in at the entrance to hives. When queens are thus introduced they are turned right amongst the worst fighting bees in the colonies. In times of scarcity when a strong guard at the entrance is needed to guard away the robber bees, even the workers that belong to the hives are required to give the countersign before entering, and if queens are turned in at the entrance, the guards seem to say, "this is no place for a queen, she belongs up in the brood nest and surely you are an intruder and a rival to this home" and they grab her as quick as a flash and destroy her at once.

If you are going to turn queens loose in your hives, I would advise that you draw up a frame of hatching brood and release the queen among young hatching bees and you will likely have better success.

The Canadian Horticulturist and Beekeeper.

ALUMINIUM COMBS.

By J. L. Byer.

References have been made to the new aluminium honey combs in this journal. I myself have had something to say about them, mostly of a favorable character. I found the bees last summer raised brood normally in the combs, in so far as I could judge. But this Spring the same bees, headed by the same queen, absolutely refused to use these combs for brood rearing until settled warm weather came.

When it did, a few eggs were at last laid in a comb next to the brood nest of a strong colony. I am much afraid that this new invention will go the way of many other things that much was expected of, but which in the actual try-out, failed to make good. I have only used them in a very limited way, so should not express my views on the matter very plainly as I might be wrong. However, my best wishes are with the inventor, and, while I have grave doubts of their ultimate adoption, I shall be more than pleased if my prophecy proves to be wrong.

The New Zealand Fruit Grower.

BEE DISEASES LEGISLATION IN BRITAIN.

By the Apicultural Editor.

Once again this is the uppermost topic being discussed at the present time in all the British bee publications, and it gives cause for speculation whether anything more than a hopeless discussion will eventuate this time. I say " this time " because I have full knowledge of the results of like discussions that have taken place periodically amongst British beekeepers during the past 15 years. It is acknowledged throughout the beekeeping world that judicious legislation is absolutely necessary to control the industry, where it is carried out on the usual commercial lines. Even the majority of the most experienced British beekeepers recognise this, but through the need of a strong lead and support, their voice is swamped by a small minority who everlastingly put forward pettifogging and litigious opposition to all suggested forms of legislation. Every now and again a fuss is made by correspondents in British bee journals about the quantity of foreign honey imported into Britain, and deplore the fact that there is not more of the home-made article on the market. Yet in face of the enormous losses of bees, and the retrogression of the industry during the past 15 years through disease, British beekeepers are still wrangling over, and keeping back the only possible remedy that can help them out of their troubles—legislation.

The New Zealand Beekeepers' Journal.

ADULTERATED BEESWAX.

We have received a sample of beeswax that was purchased by a firm, which, on being subjected to the usual alcohol test, proved to be adulterated. The wax looks very like the genuine article, but has rather a shiny appearance. We understand the firm is prosecuting the vendors.

Last year we were shown a sample of a large purchase made in the Waikato. This was beautifully moulded, and to the ordinary person would appear as a splendid sample. But to an experienced beekeeper it looked a little too shiny. This was tested in our presence at the Ruakura Apiary, and was decidedly adulterated. The wax was returned to the purchaser, who demanded his money back, and, of course, got it.

We would warn our readers to be very careful in buying wax from other than beekeepers, because if a man bought a quantity of this adulterated stuff and mixed it with his genuine wax for foundation making, it would mean serious loss. We suggest prosecution as the best means of stopping this stuff getting on the market.

The Australasian Beekeeper.

BEEKEEPING IN ENGLAND.

By W. G. Humphrey.

The British Isles does not lend itself to the professional beekeeper who makes a commercial proposition of the business.

While there are a few such men, I was informed that it is doubtful if there are more than half-a-dozen men who own and operate more than 100 colonies.

The greater part of the honey produced in England is by the cottager, who owns up to about 20 colonies. When we consider the population of the British Isles and the rather adverse climate for bees we can see that these Islands will never produce anything like the quantity of honey they can consume.

The majority of the members of the British County Beekeeping Associations are people who own one or two hives and some of them know very little more than that a bee is a " stinging fly."

This class of beekeepers, instead of looking after their pets themselves, call in the association expert, who overhauls the bees and gives advice. Those cottagers who take an interest in their bees welcome the visits of the experts and, after a few years, they will only receive one visit annually from their association expert.

Proceedings of Associations and Clubs.

Society lives by faith, and develops by science.—AMIEL.

The Development of the Apis Club.

The first General Meeting of members of **The Apis Club** was held at the Central Hall, Westminster, on May 29th. Mr. J. B. Lamb, Chairman of the **Middlesex Beekeepers' Association**, presided.

There were present representatives of various Associations and firms in the Appliance Trade as well as a fairly good attendance of individual members, in spite of the advance of the beekeepers' season which meant inconvenience to the busy men who attended and hindered others from doing so.

After communicating to the meeting messages of regret at inability to attend from the Rev. John Beveridge, Messrs. T. W. Cowan, Gilbert Barratt, J. Herrod-Hempsall, and Thomas Holt, the Chairman paid a high tribute to the character of the work and the manner in which it has been conducted for the past year in the face of exceptionally difficult circumstances. Amidst cheers he emphasised the high idealism which informed the **Apis Club Movement** and its fitness to survive.

On behalf of the Organising Secretary, Mr. A. F. Harwood, who visited the Club Headquarters on several occasions and examined its books and files, was called upon to review the work for the year and to give a statement of accounts, which latter showed a deficit of approximately £900. The Chairman read a communication from Mr. Thomas Holt on the organisation of the Club, but the time of the Conference was occupied by a lengthy financial discussion in which—and in the rest of the proceedings—Dr. Abushâdy took part.

The Conference felt that a public scheme of the character of the **Apis Club** could not prosper without the patronage of the whole Craft. Since already fourteen Beekeeping Associations in the United Kingdom, apart from Societies abroad, have shown practical interest in the Movement, this indicated a good beginning. But as no constructive proposals were available for greater development, it was felt that the Meeting could not proceed with formulating plans and arriving at concrete proposals there and then. The following resolution was therefore unanimously passed :

" That as it is the opinion of this Meeting that the **Apis Club** should be maintained and that its official organ should be THE BEE WORLD, a committee shall be appointed to go into ways and means with the founders and make arrangements with them to carry on THE BEE WORLD if that course be possible, and to formulate the future of the Club."

The members appointed were as follows : Miss Annie D. Betts, B. Sc., Messrs. R. R. Babbage, Gilbert Barratt, A. F. Harwood, C. P. Jarman, Dr. T. D. Newbigging and Mr. R. Whyte.

This Committee afterwards held a long sitting at the office kindly placed at their disposal by Mr. D. Fielden, in consultation with Dr. Abushâdy (as inaugurator of the movement) and Mr. Robert Lee (on behalf of Adminson Ltd., who have strongly supported the work during its first year).

The Committee after canvassing various proposals finally suggested to Dr. Abushâdy that Messrs Adminson Ltd. be approached with a view to enlisting their further support. This was considered to be the only practical means of safeguarding the existence of THE BEE WORLD and permitting the rank and file of beekeepers to have a share in the shaping of its policy, while establishing it on business lines.

A Sub-committee consisting of Dr. A. Z. Abushâdy and Mr. A. F. Harwood was appointed to revise the Constitution of the Club in the light of present circumstances; these gentlemen reported that it would be advisable to continue the present status for another year and to hold a second conference early in April 1921, so as to give an opportunity to the then members, either to develop the Club as an international co-operative as well as academic institute or to limit its character and scope to the latter with a modified constitution.

The members of the select committee feel it their duty, in view of the exceptionally heavy responsibilities with which Dr. Abushâdy is still charged, to urge the Beekeeping Public in the United Kingdom, as well as their confrères abroad, to do their very utmost to assist him in bringing the good work to which he is whole-heartedly devoted to a triumphant issue.

A. F. HARWOOD
(Official Reporter to the Conference).

Re-Stocking in Devastated France & Belgium

THE SOCIETY OF FRIENDS.

Is a religious Society whose members since its foundation in the seventeenth century have held warfare to be contrary to the ideals of Christianity. In 1870-71 the Society sent a relief expedition to France: and since 1914 a similar expedition "**La Mission des Amis**" has been working amongst the civilian population behind the lines and the refugees in the interior of France. At the end of the war the "Mission" turned its attention to helping these people re-establish themselves in their ruined villages. The work of the members of the expedition is entirely voluntary. They receive no salaries and have served simply from a desire to help those in need.

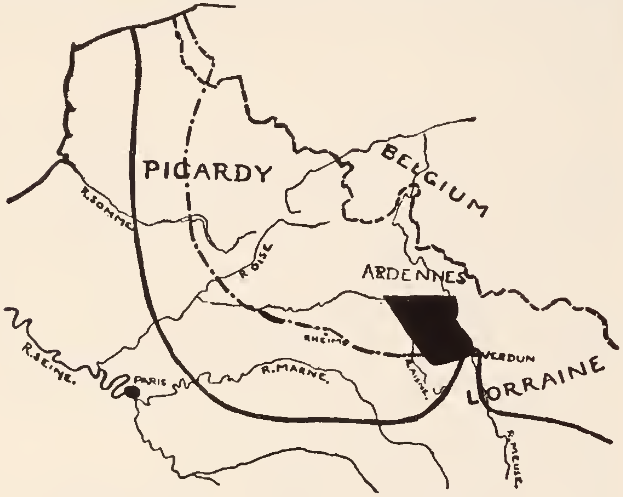

Fig. 3.—Map showing the devastated area in North Eastern France.

The parts destroyed are included between the frontier and the heavy black line, while the part round the dotted line has been totally destroyed. Where bees were distributed by the Mission is shaded black.

SCOPE AND GENERAL NATURE OF THE WORK.

In November 1914, a little group of 33 people landed in France without any definite plans, but ready to turn to whatever work seemed most needed. They found work (under the French Service de Santé) on the battleground of the Marne, where they repaired houses, gave medical assistance and helped to find bedding, blankets, furniture, tools, etc., etc., for the returning inhabitants. The character of the work undertaken became clearly defined at this time and the foundations were laid on which the subsequent developments took place. Medical help, agricultural work, building, general relief, transport, these have been the principal activities of the Mission, both in the Marne, the Meuse, and in the towns of the interior, overcrowded with refugees from the war stricken areas.

Another branch of the work was in the preparation of a large number of wooden houses in sections for use after the war. For the manufacture of these huts, two factories were opened in the Juras and staffed by Mission workers. During 1918 the Mission was making plans for undertaking work after the war in the districts over which the main fighting had taken place, so that after the Armistice they were ready to move on up into new fields.

The Mission has given help in various ways:

1. The free gift of clothes, bedding, furniture, etc., to those who were unable even to find the means to provide themselves again with the necessities of life. 2. The sale of articles at nominal prices to those unable to pay the full cost price. 3. The sale of articles in "shops" installed in the various villages, at cost price or sometimes less. 4. The free gift of all services rendered by the Mission in all its activities.

The shops, designed at first to supply furniture and bedding, rapidly became centres for the distribution of tools, ironmongery and in fact almost everything for which there was any demand. Ultimately the good-will was turned over to the "Société Co-operative Départementale" and all who had been customers were given shares in the hope of interesting them in the ideals of co-operation.

BEES.

The supply of bees, with which this report deals, was one of the lesser branches of the agricultural work undertaken by the Mission.

Before the war, the Northern Meuse and the Ardennes were good bee-country, and well stocked with apiaries. Practically all these were robbed or burnt out either in the first advance of 1914, or subsequently during the war and when in the winter 1917-18 the post war plans of the Mission were first formulated, one of the lines of work suggested by M. le Sous-Préfet, of Verdun, was the supply of bees as a start towards which he kindly offered 20 colonies which had been promised him by the American Red Cross.

THE BEGINNINGS.

During 1918, the Mission was expecting to concentrate its post war work on a group of villages west of Verdun in the Cantons of Clermont and Varennes en Argonne and plans were originally made to supply beekeepers in those villages alone. The best of the wood from that used at Dole for huts was chosen and put aside to season, and from this sixty frame hives were cut out. Supplies were purchased and the apiary itself was started in the spring of 1918, when 12 skeps of bees were purchased and installed in the garden of the Maire at Evres. Unfortunately however, owing to the difficulty of procuring "Carnets d'étranger" the bees had to be left untended the greater part of the summer and as the season was a poor one for honey, they did very little.

In August the work was recommenced, delivery of seven of the 20 swarms promised by the A.R.C. was obtained, a colony, and two lots of driven bees were presented and with the aid of a grant of sugar from the A.R.C. the apiary was rapidly transformed, so that there were five skeps and nineteen colonies in newly painted frame hives ready for winter quarters.

PLANS FOR 1919.

The coming of the Armistice in November 1918, made it possible for the Mission to undertake new work and the winter 1918-19 was spent in active preparation for it. Arrangements were made with the "Société Centrale d'Apiculture de France" whereby the Mission undertook to be responsible for supplying bees in the area already mentioned, and a list was then obtained from the "Société d'Apiculture Meusienne" (the local society of beekeepers who had lived there before the war). During 1918 the Mission had, through the Sous-préfecture, been getting into touch with as many as it could trace of the inhabitants, and a letter was sent out to all the beekeepers explaining the proposed plans and asking for information and suggestions.

About Easter of 1919, Mr. Boyden, of the A. I. Root Co., generously offered on behalf of his firm to supply a quantity of hives to beekeepers of the devastated areas at half price, and to pay the carriage charges to New York if the Mission would undertake subsequent arrangements and distribution.

With the establishment of the field headquarters of the Mission at Grange le Comte near Clermont it became necessary to move the apiary also nearer to the new field of work and Dombasle was chosen as the most suitable place, the Maire kindly offering the use of an orchard. Two huts were erected to serve as workshop and storeroom, and the apiary (now increased by further purchases to some 40 colonies) was moved up ready for the summer's work. From this time onwards the work of making and painting hives, fitting the foundation into frames, transferring skeps, taking swarms, rearing queens to make nuclei, etc.. etc., continued steadily till the end of the season.

PRODUCTION.

The season started late as there was snow on the ground on May Day, but closely following that a spell of hot weather brought into full bloom all the fruit trees for which the neighbourhood of Dombasle is noted, and for a fortnight the bees increased so rapidly that it was difficult to keep up with them. The fruit trees were followed by sainfoin (which before the war was the main crop in the district) but as there had been no rain in the interval, this failed after about three days. From this time until the middle of July was a most trying period, chilly and cloudy, but without rain, and so little honey coming in that the balance colony showed no substantial increase, but only slight daily variations.

In increase the plan adopted was to make small nuclei and spend care building them up, leaving as many colonies as possible at their full strength for honey gathering, rather than reducing the greater part of the colonies to smaller ones. During this period the nuclei were fed steadily with sugar syrup in slow feeders and in the strong colonies, with the exception of a few which had been put aside for honey-production, rapid feeders were put on so that a supply of combs were built out filled with syrup, ripened and capped ready for driven bees in the autumn.

From about the 20th of July the conditions improved again, and though the main honey-flow was over, and lost, the bees gathered surplus steadily so that after taking out about 100 kgs. of honey for the use of the Mission there was still 300 to 350 kgs. of stores ready for driven bees. About the middle of August came another rainy spell, and after that though there were still flowers, the honey flow slackened off and practically ceased with the usual results of increased difficulty in manipulation through the bees being somewhat short-tempered and inclined to rob.

DISTRIBUTION.

While this work was going on the distribution of the colonies produced had to be arranged for. Very few replies had been received to the letter sent out in the spring and the next step was to advertise the bees in all the Mission shops. This again did not prove very successful and those who wished to restart were ultimately found partly by personal enquiries and investigations and partly through the aid of the beekeeping Societies of the Meuse and Ardennes : for by this time it had been decided to extend the work of the Mission into that department.

Consequently the distribution took place in the latter part of the summer and was of colonies with sufficient stores for winter rather than of swarms and empty hives in early June as had been hoped. The problem now came up of transporting heavy colonies with new combs full of stores, over the exceedingly rough roads which were one of the legacies of the war. However this was successfully met, only two out of about 150 frame hives so transported breaking down en route.

THE PERMANENT APIARY.

Following up the suggestion outlined in the letter sent out in the spring, an offer was made to the Société d'Apiculture Meusienne of a permanent apiary consisting of about thirty colonies of bees, together with materials and tools, so that they might be able to continue the work of restocking, and afterwards possibly undertake educational work.

Six extractors were also placed in the hands of the Société Meusienne and the Abeille Ardennaise for the use of those to whom the Mission had supplied bees, and sundry small matters such as the supply of beekeeping books, blue prints of the Mission hives, etc., etc., also received attention.

PURCHASE OF SKEPS.

Another development of the work was the purchase of skeps of bees, and in the actual number of colonies and amount of money involved, this considerably exceeded the Dombasle work. One wagon load of skeps were purchased in Normandy in the spring of 1919 and convoyed into the Ardennes, but the main part of this work came in the autumn at the time when the skeppists take up and destroy their surplus colonies. The bees so purchased were bought at the market value of the honey, convoyed into the Meuse and Ardennes and sold at about half their cost.

The first step was to get in touch with the skep beekeepers and towards this end, M. Prieur, editor of the " L'Apiculture Francaise," kindly devoted a paragraph in his August editorial. This brought in a number of offers of help from beekeepers in the districts where skep beekeeping is practised, and these were followed up and resulted in the purchase of five wagon loads of skeps, one load of frame hives and skeps and one small consignment in Brittany, Normandy, the Mayenne and further south in the Landes. In each case the work of arranging with the actual sellers for the purchase, packing and transport of the bees and the selection of suitable colonies was undertaken by a local beekeeper. The Mission then sent workers to make the actual purchases, help with the packing and loading, and to undertake the convoying and distribution. Without the help of these beekeepers, the Mission would have found it difficult—if not impossible—to accomplish the work, owing to the conservatism of the peasants and their unwillingness to deal with strangers.

In the distribution of these bees, four wagon loads were sold **en bloc** to the Abeille Ardennaise, and the other three were distributed amongst the beekeepers themselves by cars of the Mission.

AMERICAN HIVES.

During the summer the offer made by the A. I. Root Co. to supply hives at half prices was followed up and ultimately 400 hives were brought over and delivered to the " Société d'Apiculture Meusienne " and the " Sociéte d'Apiculture de l'Est " at Bar le Duc and Nancy respectively. These societies undertook the individual distribution amongst their members.

RESULTS.

Briefly the results of the work may be summed up as follows :

1. In the districts of the Meuse and Ardennes in which work was undertaken by the Mission : a district bounded roughly by the roads joining Verdun : Les Islettes : Attigny : and Sténay, and comprising possibly a fifteenth of the devastated areas of France, strong colonies of bees were available for any who wished to buy them at about one third of their current market value.

2. In the Ardennes four wagon loads of bees were sold to the Abeille Ardennaise at reduced prices, and

3. In the Meuse, a permanent apiary of 30 colonies and material to the value of about 7,500 francs, was left in the hands of the Société d'Apiculture Meusienne.

Tabular returns will be found in the appendix but by no financial statement can the real value of the work be judged. War always and inevitably brings with it sorrow and desolation, and the **Mission des Amis** has sought through its work to try to bring peace to those who have suffered, to replace bitter feeling by friendliness, desolation by hope, and sorrow by renewed faith. Our work is little indeed compared with all that needs to be done, and even then we are conscious of failure through the selfishness and pride which mar all human effort : but in so far as success has been granted us, even if it be in a small measure only, we have to that extent helped to make known the virtues of that life and power which takes away the occasion for wars.

The work has been done without seeking reward ; but those who have worked have found a reward in the response they have found amongst those for whom they have been working. The following translation is of a letter from a curé in one of the villages near Dombasle:

DEAR SIR,—I was very greatly touched by the mark of kindness which you have shown me in offering me a copy of the " A.B.C. d'Apiculture " : the more so as I was very desirous of getting another copy of this book, lost with so many others during the war.

I appreciate all the kind attention you have given me. I perceive the charitable motives by which you are guided, and I am aware of all the good you have accomplished.

Be so good, Dear Sir, as to accept my warmest gratitude.

Yours very truly,

Financial Statement and Tabular Returns of Beekeeping Work undertaken by the Mission des Amis, 1918-19.

EXPENDITURES.

By Cost of Dombasle Apiary.—	frs.	frs.	frs.
Excess of Expenditure over Receipts :			
Estimated loss through setting selling prices below estimated cost	500.00		
Increased cost of beeswax foundation above estimate	600.00		
Bees lost in transit	400.00		
Sundry unforeseen disbursements	757.25		
		2257.25	
Working Expenses :			
Wages to French employees ..	1746.00		
Carriage charges	202.05		
Travelling Expenses, etc. ..	774.70		
Sundry	162.55		
		2885.30	
			5142.55

(For this sum 154 colonies of bees were sold at about 20,000 frs. below their market value).

By Gifts :	frs.	frs.	frs.
Permanent Apiary :			
Bees	1946.80		
Material and Tools	1988.10		
		3934.90	
Sundry Gifts :			
Bees	600.00		
Extractors	550.00		
Books	206.60		
		1376.60	
			5311.50

(The actual value of the apiary was 7586.30 frs., but the figure given above is based on the reduced prices at which similar goods were sold to individual beekeepers).

By Cost of Convoy Work :	frs.	frs.	frs.
Loss through selling below cost price		12949.00	
Loss of bees en route		364.80	
Travelling expenses, etc. ..		1615.75	
			14929.55
Value of Gift of A. I. Root Co.			
400 hives with supers and foundation supplied at half price, approximately			12000.00

Colonies of bees distributed by the Mission des Amis :

Department	Frame Hives	Skeps
Meuse		
to individual beekeepers	85	146
to Société d'Apiculture	15	15
	—100	—161
Ardennes		
to individual beekeepers	54	161
to L'Abeille Ardennaise	30	about 250
	— 84	—411
Marne		
to individual beekeepers		6
		— 6
Meurthe and Moselle		
to individual beekeepers		6
		— 6
	184	584
Total	738	

Of these bees there were 154 colonies in frame hives produced at Dombasle. In justification of this figure, which may seem rather small, the policy adopted was to send out good strong colonies, rather than to produce for quantity, and no colonies were sent out without at least 15 kilos of sealed stores for winter. Whether this policy was justified can only be judged by the future results. The extremely mild winter of 1918-19 will certainly have meant a heavy honey consumption per colony and so have justified the heavy stores.

Scottish Beekeepers' Association.

The Quarterly Meeting of Council and Annual Conference of the S.B.A. was held in the Meeting Room during the Highland Show in Aberdeen. In the absence of the Hon. President, the Duke of Atholl, the chair was taken by Mr. J. J. Moubray, Lord Lieutenant of Kinross, who expressed his pleasure at presiding over such a large and representative gathering from all parts of the country. The Hon. Secretary, Rev. J. Beveridge, M.B.E., read apologies from the Duke of Richmond and Gordon, Mr. J. R. Dickson, Vice-president, and others. The Minutes of last meeting were read and confirmed. It was reported that since the beginning of the year, six new associations had been affiliated and the membership now exceeded 5000. On account of the increasing size of the Association it was resolved to remit to a special committee, the task of preparing the draft of a revised constitution to be submitted for consideration at the next meeting.

The resolution that the Council should henceforth meet in a different centre each quarter, in order that the various associations may have an equal opportunity of sharing in the conduct of affairs, was unanimously confirmed ; and the next meeting was appointed to be held in Glasgow in October.

It was also agreed to appoint a new Committee to deal with all matters relating to the subject of Beekeeping for Women, Lady Salvesen and five other ladies being nominated as the nucleus of the committee.

REGISTER OF BEEKEEPERS.

It was reported by the Registrar that considerable progress had been made with the Register, which now contains the names of over 7000 beekeepers with 23,000 hives. As the verification and supplementing of the registration proceed, it is estimated that the actual number of beekeepers will considerably exceed 10,000 and may possibly reach 15,000, with 50,000 hives. The possession of this register will enable the S.B.A. in due time to organise the beekeepers systematically in every corner of the country. At present we have discovered that there is at least one beekeeper for every 6 square miles and for every 1,000 of the population and one hive for every 800 acres. But Aberdeenshire has the splendid record of a beekeeper for every square mile and for every 150 of the population, and a hive for every 200 acres. But so far as is known, there are no beekeepers in Shetland or in Barra, and in many of the smaller isles, and only 8 in Selkirkshire.

The Markets Committee recommended that the price of first grade sections and extracted honey should be 3/– per lb., and second grade sections 2/9. The heather honey price will be fixed later on and will be published on 10th September.

The Shows Committee was congratulated on the excellent arrangements for the Annual Exhibition, which had been so successful, and which was continuing to attract the Aberdeen crowds. Special thanks were awarded to the Convener, Mr. A. A. Blair, and to Mr. Anderson, of the North of Scotland College, as well as to the various lecturers and demonstrators in the Bee Tent, which was in constant use every day of the Show.

The education Committee reported that there was a large number of applicants for examination for the various certificates, and the full list would be issued in a day or two, giving the successful candidates.

The Secretary reported that he had just received notice from the Board of Agriculture that a sugar-ration of 14 lbs. had been secured for all who applied to the Local Food Officer, specifying the number of stocks and the retailer selected.

The usual hearty votes of thanks to Chairman and Hon. Secretary brought the meeting to a close.

EXAMINATION RESULTS.

HONEY JUDGE (eight candidates).

John Anderson, M.A., B.Sc., Aberdeen; Henry Crombie, M.A., Dunkeld; James R. Fenwick, E.B : S.B.A., Perth.

EXPERT BEEMASTER CERTIFICATE (E.B : S.B.A.)

16 entries.

James S. Barron, M.A., Wick; Miss M. Mavor, Rafford, Forres; Donald Corrigal, M.A., Rothiemay; Miss N. Meston, Auchedly, Tarves; James R. Fenwick, Perth; Miss Margaret F. Pirie, Aberdeen; James K. Greig, Closeburn; Alexander W. Ross, M.A., Rora, Longside; Alexander Low, Newmachar; Alec Steven, L.R.A.M., Glasgow.

BEEMASTER CERTIFICATE (B : S.B.A.) 40 candidates.

Miss Andrina Goudie, Geosetter, Shetland; Bryce Whiteford, Stranraer; John Cunningham, Bonhill; H. M. Stich, A.R.T.C., and Walter Stich, B.Sc., Paisley; Mrs. Isa Valentine, G. Martin, J. Webster, R. Harper, Knock, Banffshire; J. Buie and P. Milne, Cornhill, Banff; William Walker, Glentanar; W. Brand, Hatton; Henry Dow, Robieston, Huntley; Marshall K. Watt, and J. L. Archibald, Aberdeen; John A. Dawson, Laurencekirk; Rev. T. F. Best, Broughty Ferry; D. R. Brown, Kilmany; Alex. Penman, Peter and Andrew Marshall, Lochgelly; J. C. Anderson and Thomas Christie, Kinglassie; James Gow and Thomas Thomson, Ballingry; Mrs. E. R. Noble, Peter Duncan and Lewis Eadie, Milnathort; David Meyler, Kinnesswood, and David McLeish, Scotlandwell, Leslie.—(*Communicated*).

South Staffordshire and District Beekeepers' Association.

A meeting of the above-named Association was held at Mr. E. H. Hipkins', Castle Mill Farm Apiary, Tipton, on Saturday, 5th June, 1920. There were about 100 members and friends present, including Miss Woodcock, Mayoress of Smethwick, Mr. Joseph Price, Stafford County Council Expert, Mr. E. C. Middleton, Streetly, and other prominent members of the beekeeping fraternity.

Mr. J. Price gave an interesting address, advising members to support the **Apis Club**. The object of the **Club** and its monthly paper, THE BEE WORLD, was research, instruction and co-ordination in all matters relating to bees and beekeeping. Dr. Abushâdy, the Secretary and Editor, deserves the support, financial and otherwise, of all beekeepers to carry on this valuable work to a successful issue. At no time in the history of the beekeeping world has the objects he has set out to attain been of more importance, considering the great havoc the disease known as the I.O.W. disease has made, and is making. No successful remedy is known, and no Ministry, Institution or Association is set aside for this important duty. He, valiantly at considerable personal expense, exhaustive labour and conspicuous ingenuity, has formulated the Club and edited THE BEE WORLD for the first year of its existence and asks beekeepers to help by joining the **Club**, to keep it alive.

Mr. Price exhibited a **Metal Comb Foundation**† to substitute Wax Foundations; he said he did not think the Metal Foundation perfect, more improvements would have to be made as to its finish, etc., and extensive trials are required to see what effect the heat of the hive would have upon the metal, whether the queens would take to it successfully; his advice was "move slowly."

Mr. Middleton, Streetly, addressed the meeting on Hive and Wintering. Don't commence too late in wintering. The hive should be filled and capped with the very best honey, the best is none to good. Not to extract too closely, leave a quantity of shallow frames for food, pack the bees closely on good food, don't pack too warm, by doing so you increase deposits of damp, which may not kill but proproduces fungoid growths and is unhealthy; 3 or 4 quilts, single quite sufficient, each quilt to be a little less than the one underneath, moisture must be absorbed. Don't paint inside of hive, paint prevents absorption and creates condensation. Aim at ventilation and absorption. If in late autumn bees are fed on sugar or honey dew, produces many waste products which fills the intestines of the bees with too much waste and in the uncertain winter weather they take a cleansing flight and suffer and die, or evacuate in the hive and on the combs which causes disease. In the event of not having sufficient natural food in mid-winter, don't use syrup, provide candy, or better still a frame of sealed honey placed on top of the frames. **Bees fed on sugar are not so strong in resisting disease as honey fed.** Bees do not hibernate strictly speaking; they slow down. Best position of hive for wintering is under north wall. Don't disturb the brood when packed for wintering; leave severely alone. Disturbance makes them restless and causes them to eat more food. Perfect rest and quietness is what is needed. Don't stimulate in spring too early, what you gain in speed, you loose in resistance.

Mr. A. Cheshire, Cosely, gave a practical demonstration in manipulating the open hive, the brood nest and finding the queen, pointing out the different stages of Brood from the egg, in the cell, to the sealed brood and the perfect honey bee. Many of the new members were much impressed in his cool and quiet manner in handling the bees. He also gave a demonstration in making frames for brood foundations out of ordinary box wood, with very simple tools of his own construction. The finished article was handed round the company for inspection who were impressed with its perfection and finish. These demonstrations were highly interesting and instructive to the young and old beekeepers.

Mr. G. F. Stubbs, Wednesbury, addressed the meeting, taking for his subject "Bees and Gardeners," said everything in nature has a duty to perform. Bees naturally are not only honey gatherers, but do great work in fertilizing blossoms. Many fruit crops depend to a great extent on bees, for fertilization. No fertilization, no fruit. Flowers produced nectar to attract the insects who in obtaining it brush off with their bodies some of the pollen, this carried to the next flower brushed against the pestil and thus pollenates. This cross-pollenation is beneficial to plant and fruit. What nature has made special precautions to ensure, is brought about in a great measure by bees and other nectar feeding insects.

Mr. Hildreth, Smethwick, addressed the meeting on "Don'ts" for beginners.

Don't open the hive without some special object.

Don't neglect to make notes of the condition of the hive at each inspection, that reference can be made to it.

Don't delay too long supering, better too early than too late, it may prevent swarming.

Mr. E. C. Hipkins exhibited a **concrete hive** and explained the making of it. He said the making of concrete hives was in its infant stages, and required many improvements and testing before it could be called a success. The probable outlay would be more expensive than wood, but its life and wear would be more prolonged.

The secretary (Mr. W. J. Walton) introduced Miss Woodcock, the Mayoress of Smethwick, who said she was not a beekeeper, but had been interested in what had taken place, and what she had heard at this interesting meeting. She might take up beekeeping herself and then she would be able to give her own experience.

A splendid tea was provided by Mr. E. H. Hipkins, and served at the Apiary under the trees skirting the historic castle grounds. All expressed their great pleasure of the success of the meeting and congratulated Mr. Hipkins and the secretary on the arrangements made.—(*Communicated*).

Glasgow and District Beekeepers' Association.

VISIT TO ERSKINE APIARY.

On Saturday, June 26th, in glorious weather a most interesting visit was paid to the Apiary in connection with the Princess Louise Hospital for Limbless Sailors and Soldiers.

Between 50 and 60 members took advantage of the courtesy of Mr. Alec Steven, President of the Association, and spent an instructive afternoon there.

The Apiary is part of the training scheme carried on by the Hospital Committee on behalf of limbless men.

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† The report is referring to the crude specimens which were supplied for testing. Arrangements for the production of marketable Metal Comb Foundation in the near future are steadily, though slowly, progressing according to available means. See the "Bee News" section of this issue.—Ed.

Here the men are taught beekeeping, a carefully graded and extensive scheme of instruction is systematically pursued.

As soon as a man shews himself sufficiently advanced, he is given a stock of bees to attend to under guidance.

Since the inception of the Hospital in 1916, Mr. Steven, the Hon. Bee Master, has carried out this work and with much success, nearly four hundred men have received instruction, some more, some less, but the great majority sufficient to enable them to make a start. Letters received from some of these men testify to the benefit they have received.

Last year the Ministry of Labour recognised this excellent work by payment of a grant.

The visitors were shewn over the Apiary, many hives were opened for inspection and all found to be in a very healthy thriving condition, as the place is primarily intended for purposes of instruction, there were seen different races of bees, British, Italian, Dutch, Egyptian. Some stocks were in straw skeps, others literally in soap boxes, others again, of course, in modern hives.

A visit was also paid to a substantial little brick-built bee house, where almost everything in the way of appliances were to be seen. Here the honey is extracted and the indoor work performed.

During the winter regular series of lectures fully illustrated are given, a distinguishing feature of the latter is the display of natural colour photography pictures.

During the afternoon, Mr. Steven gave a ten minutes address, the subject being the "Three factors essential to successful beekeeping":

(1) The necessity of having a great force of bees per stock.
(2) This force should synchronise with the period of the honey flow.
(3) The proper weather to secure the harvest.

The first two factors can be controlled by the intelligent apiarist, the third factor is of course beyond the control, but much could be learned by a study of the prevailing outside temperature, maximum and minimum.

The Hon. Secretary drew attention to the visits arranged on July 10th and August 7th. A good response being made to his appeal for subscriptions in aid of the Show of Honey, etc., in connection with the Glasgow and West of Scotland Horticultural Society on September 1st and 2nd.

At the conclusion a vote of thanks was accorded Mr. Steven for his kindness.

PETER BEBBINGTON
(Hon. Secretary).

* * *

South Western Counties Convention of English Beekeepers.

What is, probably, the first general Convention of Beekeepers ever held in England, took place in Gloucester on July 27th, 28th, 29th.

Thanks to the energy of the Hon. Secretary of the G.B.K.A., the Rev. Edward J. Bartleet, Quedgeley Rectory, Gloucester, ably assisted by the Committee, invitations to take part in this proposed Convention were sent to the Hereford, Monmouth, Somerset and Worcester Associations; and their respective Secretaries met some time beforehand to arrange details. The idea was very enthusiastically taken up and the result was a large and representative gathering of beekeepers from all parts of the above-named Counties.

A most attractive programme had been arranged, and the weather departing from its late usual depressing character, allowed it to be carried out under favourable conditions.

The meetings were held in the Shire Hall, Gloucester, and at the first of these on Tuesday, July 27th, the Mayor of Gloucester presided and gave the members on behalf of the ancient and historic City, a real hearty welcome. In the course of a capital speech, he said another link in its history had been forged by the first known Convention of Beekeepers in this country being held within its walls. He himself was not a beekeeper, he regretted to confess, but he well knew the absorbing interest of the Craft and its great National importance as a most useful and necessary food producing agent.

Mr. G. W. Bullamore (Director of the Institute of Beekeeping, Cambridge) was the first lecturer on the programme.

In "The Evolution of Beekeeping," most ably treated, he gave the large audience an extremely interesting account of the history of the Honey Bee from the earliest times right down to the present, dealing, *en passant*, with "Telling the Bees," "Tanging" "Bee hunting," etc., finishing with modern methods, size of frames and other details of interest.

At the close of a splendid lecture he kindly answered many questions put by the audience.

In acknowledging a very hearty vote of thanks, Mr. Bullamore said he hoped that as a result of the work being carried on by the Beekeepers' Institute, he would, at a later date, be able to deal with present day problems and practice, as a sequel to "The Evolution of Beekeeping."

After tea, which was as welcome as usual, many of the Members were taken for a tour of the City, under the able guidance of Messrs. J. W. Barnett and Max Bellows, who pointed out the various points of interest connected with "Old Gloucester," others visited Mr. Burtt's bee appliance factory, and several went to Quedgeley to inspect the Rev. E. J. Bartleet's Apiary.

There was a large attendance at the Parkend Empire Picture House on Wednesday morning, when Mr. Bee Mason, who is described as "Britain's Greatest Bee Hunter," gave a most interesting lecture illustrated with wonderfully beautiful cinematograph films, on "The Craft of the Bee Hunter." The audience was greatly interested in seeing the way in which a modern beekeeper can handle the bees, not only in the movable frame hives, which was fairly simple, but in the difficult operation of moving them from awkward places, such as the side of a house, or out of a hollow tree.

The beauty of the pictures, and the eloquence of the lecturer, were a very notable feature of the Convention and the impressions received are not likely to be soon forgotten.

A number of children from the County Schools were present, by arrangement with the County Education Committee.

In the afternoon the President of the G.B.K.A. (H. Dent Brocklehurst, Esq) most kindly received a large number of those attending the Convention, and he and his family showed them over his intensely interesting and beautiful house, Sudely Castle, Winchcombe, at one time the home of Katherine Parr, wife of Henry the Eighth. The weather was fine and a most enjoyable afternoon came all too quickly to an end.

On Thursday morning a visit was paid to Gloucester Cathedral. Bishop Frodsham gave a most hearty welcome to those attending, on behalf of the Dean and Chapter. In the course of a splendid address he traced the connection of bees with religious thought from the earliest times, quoting many interesting legends, and showing how beekeeping was a symbol of that beneficient power which "shapes our ends rough hew them as we will."

He then described the patient work of the Cathedral builders, and subsequently conducted the members of the Convention round the building. Following this, the members gathered in the Shire Hall, and listened to a lecture by Mr. G. G. Desmond, of the G.B.K.A., the Rev. E. J. Bartleet presiding. Mr. Desmond said his lecture was entitled "The Bee as a Seedsman." He showed that flowers could only be successfully fertilized by the pollen of other flowers, and such pollen could only be taken to it upon the breast of the bee. There were certain trees which could not be fertilised except with the pollen of different kinds of trees. If fruit growers were to have the best crops, it was necessary that they should plant trees which would allow of cross fertilization, and also provide the bees to distribute the pollen. It had been proved by many experiments that plants and trees which were kept without the ministrations of bees were unproductive. It might be thought that the wild bumble bee would be sufficient to fertilise the fruit and flowers, but they had found that certain common kinds of bumble bees, instead of taking the pollen from the top of a flower, perforated the back of the blossom, and so caused the blossom to fail. As a result of his experience he would say that all seedsmen would be well advised to keep hive bees for the purpose of fertilizing their seed. No wild bee carried out the mass fertilization which the seedsman required to be done. If they took away the hive bees, the production of this country would greatly decrease. The lecturer touched upon different kinds of plants which might be grown in England, and which would result in increased production, as well as in the production of honey. In conclusion, the lecturer advised all who depended upon fruit and other crops not to forget the bees. If they provided an adequate supply of bees they were bound to enjoy better crops.

It was a splendid lecture and at its close Mr. Desmond was heartily thanked.

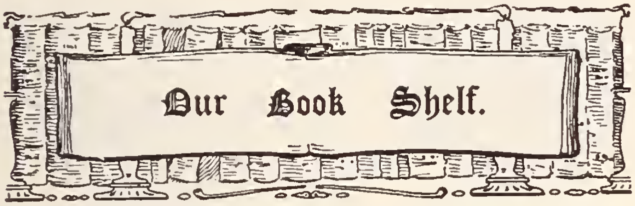
Mr. Graham Burtt then gave an interesting account of his efforts in helping to re-stock with bees devastated areas in France, and spoke of the practice adopted by the French beekeepers.

In the afternoon Col. E. S. Sinnott presided over a meeting at which the question of the holding of a future Convention was discussed. Opinion was unanimously in favour of making the Convention an annual event, and the arrangement of details was left to a Committee, the suggestion being that a Convention shall be held in rotation in the five Counties—Gloucester, Hereford, Monmouth, Somerset and Worcester—connected with the South Western Association.

A very cordial vote of thanks was passed to the Rev. Edward J. Bartleet (Hon. Sec.of the G.B.K.A.), together with the Committee and Mr. E. J. Burtt, for the energetic and successful manner in which the Convention had been arranged and carried through.

The concluding lecture was given by Mr. Leedham (Worcestershire) who furnished many interesting and informative details relative to " Queen Introduction " and the condition under which such introduction was successful or failed. Questions were afterwards asked, and answered by the lecturer.

So ended an historic and most successful and helpful Convention, which, without doubt, will have a great influence on the future of beekeeping in England.—(*Communicated*).



Our Book Shelf.

Books still accomplish miracles ; they persuade men.—CARLYLE.

AMERICAN FOUL-BROOD AND EUROPEAN FOUL-BROOD.

By DR. G. F. WHITE †

These two important papers are uniform with those on Sacbrood and Nosema Disease, by the same author, and are of exceptional interest

They deal respectively with the two forms of foul-brood, generally distinguished in England as " strong-smelling " (European) and " odourless " (American) foul-brood. The reviewer would like to observe that **the English names are most unsatisfactory,** since European foul-brood is odourless in America. This is probably due to the presence in European foul-brood (as met with in Europe) of some micro-organism not found in America. The names were given for the reason that the diseases were first studied by Europeans and Americans respectively, and not (as sometimes been imagined) to indicate geographical distribution. The two diseases are found in both continents.

After giving a description of healthy brood as it appears at the age at which is attacked by the disease, the author describes the general symptoms, predisposing causes, the bacteriological characters of the causal organism, the technique used in the research, and a considerable number of experiments on the resistance of the microbe to various agents and to disinfectants.

As it is hoped to give shortly in THE BEE WORLD a full discussion of the bacteriology of foul-brood, the practical deductions only will be given here.

European foul-brood is caused by the so-far uncultivatable organism **Bacillus pluton**. It attacks unsealed larvæ about 4 days old, the incubation-period being slightly under 3 days. The brood almost always dies before being sealed ; and dead pupæ are seldom found. The diseased larva is at first yellowish ; this tint later deepens to various shades of brown. The scale remaining in the cell is not so firmly attached to the cell-wall as in American foul-brood, and are also less brittle than in that disease. No unpleasant odour is noticed (in America).

There is a better chance for a colony to recover spontaneously from this disease than in the case of American foul-brood.

American foul-brood is caused by **Bacillus larvæ,** cultivatable on bee larva bouillon media and some others given in the paper. It attacks larvæ that are (or are about to be) sealed over ; the incubation period is 7 days. Unsealed brood rarely dies of this disease ; dead pupæ are frequently found. The diseased brood is at first very light brown ; this gradually darkens to deep brown, by which time (the 4th week after death) the characteristic " ropiness " has developed. The decaying brood can be drawn out into long viscid threads, which is not—or only slightly—the case with European foul-brood. The scale is brittle and adheres rather firmly to the cell-wall. A characteristic odour is present, " usually thought of as being disagreeable."

Though American foul-brood may make very slow progress in an infected colony, the stock apparently never recovers if left alone ; but with suitable treatment there is a good chance of recovery.

Both diseases attack all larvæ—queen, worker and drone—alike ; but adult bees are not affected.

Bacillus alvei, once supposed to be the cause of European foul-brood, is not pathogenic, but is one of the regular secondary organisms present in this disease. In American foul-brood there are normally no secondary invaders present.

Robbing, and careless interchange of combs in the apiary, are the chief causes of spread of both diseases.—A. D. B.

FOUL-BROOD AND ITS TREATMENT. ‡

By NANCY M. ROBINSON, F.R.M.S.

An excellent leaflet, describing the symptoms of foul-brood, and of sac-brood, and giving very clearly-worded directions as to how to treat a diseased stock.

No attempt is made to distinguish between European and American foul-brood, as this is considered too difficult for a novice, and the treatment is the same for both diseases.—A. D. B.

(a) ISLE OF WIGHT DISEASE IN HIVE BEES. *
(b) NOSEMA APIS IN HIVE BEES.

By JOHN RENNIE, D.Sc., and ELSIE J. HARVEY.

One of the authors of the above was joint author of a former paper (Proc. Roy. Phys. Soc. Edin., 1916), in which experiments and observations were cited to show that contact with infected hives and stores does not always produce I.W.D. in bees. The present papers are a continuation of this work.

(a) Cases are described at length in which the bees of a stock showed every sign of I.W.D., but no **Nosema** (in any of its stages) was found in them. An instance is given where a stock robbed out a case of I.W.D., and yet remained healthy ; their champions will be pleased to note that these were Dutch bees. As a rule, however, stocks coming in contact with **sick bees** contract the disease.

The disease is not transmitted, seemingly, by the queen (if introduced to a healthy stock) either hereditarily or by direct infection of her attendants. Brood from an infected stock is healthy, and the malady is not conveyed by combs. There is a suspicion that the output of a queen from an infected stock is not so good as that of a queen of the same age from a healthy stock. It is not certain that drones contract the disease. The chief means of transmission is the sick worker bee, whether nurse or forager.

Signs :—Crawling and inability to fly. Often, as a result, the colon is overloaded.

(b) In the second paper, a number of experiments are recorded which show that the behaviour of the bees of a stock infected with **Nosema** is in striking contrast to that observed in the case of I.W.D. **Nosema**-infected bees will continue to forage ; they do not " crawl" until actually dying, nor do they cluster about the entrance or on the ground as in I.W.D. " The loss to the stock is to be measured by a shortening of the life of the individual bee and not by a premature cessation of its activities."

The infection of the queen is frequent, and is an important factor in the spread of the disease within the hive. This is much more rapid when the queen is infected. Queens of **Nosema**-infected stocks often die or are lost, again in contrast to what occurs in I.W.D., where the queen is often the last survivor.

Nosema is always weakening to a stock, and reduces the amount of surplus gathered. It may, in suitable conditions, become seriously pathogenic ; but does not usually destroy colonies in the rapid and virulent way we associate with I.W.D.—A. D. B.

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† U.S. Dept. of Agric., Bulletins 809 and 810.

‡ Bee Disease Investigation, Parasitology Department, Marischal College, Aberdeen.

* Univ. of Aberdeen, Bee Disease Investigation, Memoirs Nos. 2 & 3. See also **Scottish Journal of Agriculture,** April and October, 1919.

AN A.B.C. AND X.Y.Z. OF AMERICAN BEE FLORA.*

The Associate Editor of the **American Bee Journal** has, in the volume under review, produced a work which, although primarily intended for American Beekeepers, is certain to be included, sooner or later, in the library of every progressive beeman whose mother-tongue is English.

Its publication adds to the debt that beekeeping owes to U.S. enterprise.

While many, perhaps a majority, of the plants enumerated and discussed are incapable of successful introduction and cultivation here, there are, on the other hand, a large number which could be brought in to supplement those already known and grown in the U.K.

Our author gives, rightly too I think, great prominence to sweet clover, **melilotus alba**, with which some of us are even now experimenting.

That section of the introduction which deals with "The Minor Plants" is so admirable in its manner and matter, that one is sorely tempted to quote it in "chunks," but that course would be open to two objections, unfairness to the author and a suspicion that the present writer is chiefly concerned to record support for his own views.

Apart from the individual plants treated of, many subjects of general interest and importance are discussed in an informative way. A most valuable article is the one on the Physiology of Nectar Secretion, reproduced from the January **Am. B.J.** Propolisation, poisonous plants and honies, pollination, meteorological conditions in relation to nectar flow are matters dealt with as closely related to the main theme of the book.

If the reviewer may be permitted a "grouch," he would take exception to the implicit acceptance of Dr. Miller's estimate of the Chapman Honey Plant.

It would add to the value of the reference to this subject if the author gave his own personal opinion founded on direct observation.

The material for this in any desired form would be gladly placed at his disposal.

No notice of this book, which omitted to call appreciative attention to the numerous and admirable illustrations, for the more part from its author's original photographs, would do anything like justice to a book which is destined to take a leading place in the bibliography of beekeeping.—A. F. HARWOOD.

BEGINNING ON THE RIGHT LINES.**

It is obviously assumed that the beginner in beekeeping in New Zealand has an eye to the commercial side of the industry. This appears clearly from the advice given in the primer compiled by the Editor of the **N.Z. Beekeepers' Journal**.

While the ground covered is thoroughly covered, the little work does not err in the direction of being too ambitious. On the other hand, experiment is encouraged and the "handy man" is given guidance in the manufacture of his own hives from material presumably readily available.

A valuable feature of the book is a calendar of monthly instructions, which, until one has sensed the difference of latitude and seasons, reads very strangely.

Two criticisms may be offered. Our author seems rather too fond of smoke. Nowhere is any reference made to the far more humane and hygienic method of using the carbolic cloth and subjugator. To the present writer, whose smoker is rusting in desuetude, the partial asphyxiation of bees in manipulation is but one step removed from the barbarity of the sulphur pit.

The useful and copiously illustrated "vocabulary" shows traces of haste. "Bees" should be re-read and polished; the jumps from singular to plural and vice-versa are disconcerting.

The definition of a box-hive would preclude the keeping of any bees other than **apis dorsata.**

These are, however, only very minor blemishes in a work which on every page shows the hand of a skilled apiarist whose efforts cannot fail to give a stimulus to the craft in New Zealand, where the standard of beekeeping is already, largely thanks to Mr. Baines, notably high.—A. F. H.

AUSTRIAN BEEKEEPING.

In pursuance of the suggestion recently made by Mr. Stich in these columns to the effect that beekeepers in this country should study the bee literature of other lands, from which they cannot fail to learn much of value, I would advocate the reading of the manual compiled by the learned Editor of "**Bienen-Vater.**"

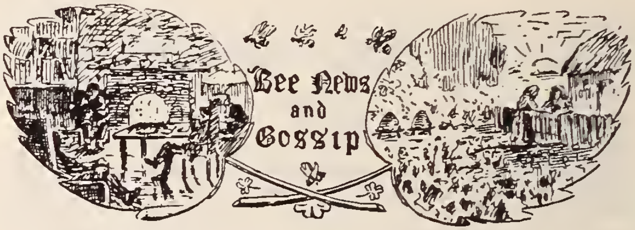
This veteran, the Cowan of Austria, has, in "**Die Biene und der Breitwabenstock**" (The Bee and the Bar Frame Hive) made a highly practical and at the same time thoroughly scientific contribution to the lore of the bee.

The tables and the condensed data on p. 13 are alone worth the price (3/–) at which the book is obtainable.

Herr Richter, who is now seventy-two years of age, still writes with all the vigor and enthusiasm of youth. His style is clear and forceful, and the information given is very methodically conveyed.

Particularly good is the section on Enemies of the Bee, in the forefront of whom he rightly puts the careless and unprogressive beekeeper.

No beeman who has a working knowledge of German should be without this, the standard book of the South German beekeeping fraternity.—A. F. H.



Knowledge humbleth the great man, astonisheth the common man, and puffeth up the little man.—PR.

QUEEN TRAVELLING WITH NUCLEUS. Perhaps one reason for preferring a small nucleus to simply buying a queen may never have come under your notice: the safety in carriage.

Once when I had ordered a queen, as the postman approached the door, he raised a small package in his hand, and giving it a vigorous shake, said: "Your bee is all right; every time I shake it, it buzzes. ......"—"Senex."

HONEY-MAKING WASPS. Mr. Frank C. Pellett, Associate Editor, **Am. B.J.,** has been experimenting this season with a large colony of honey-making wasps belonging to the genus Nectarina, from Rio Hondo, Texas. "These insects," says our contemporary, "are common in the tropics, from Mexico to Argentine, but are unknown in the United States except in the lower Rio Grande Valley......They are a source of great curiosity to nature lovers, as they are unlike anything known in the Northern States. They make paper combs like other wasps, but store honey like the bees. When they sting they lose their stings, as do the honey bees, and they are said to swarm like the bees."

TWO QUEENS IN ONE CELL. "On June 15th, I was preparing to transfer some larvæ for queen-raising, and when searching for cells from which to secure royal jelly, I was surprised to find a queen-cell about two inches long but not over size in diameter. I removed the sealed larva and jelly until I found an unoccupied space of about ½-inch, then more jelly. After dipping out part of this upper jelly I found another larva, making two in one cell. Did you ever meet with a similar case? As I was not expecting to find the second larva, I did not notice it until part of the jelly had been removed; so I am uncertain as to whether the larva was in its proper position or not. It was up in the top of the cell when noticed, but it may have been pushed there in removing the royal jelly."

The above communication by Mr. Hugh L. Lynn appears in **Gleanings** for August, with the following comments by Editor Root: "Last week some of our queen-cells were sealed when the larvæ had just hatched, but we have never known of a case such as you mention."

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*__American Honey Plants.__ Frank C. Pellett, American Bee Journal, Hamilton Ill. 1920. 297 pages, 155 illustrations. Price 2 dollars 50 cents.

** __Beekeeping for Beginners.__ Fred. C. Baines, Kati Kati, Bay of Plenty, W. 3.

KILMARNOCK APIARIES.

" Members of the **Ayr, Glasgow, Greenock** and **Kilmarnock Beekeepers' Associations** are greatly interested in the model apiaries of the **West of Scotland Agricultural College** at Kilmarnock. There was a very large attendance at the excursion....... The college apiaries comprise over 100 colonies of bees in various modern hives. Several varieties of breeds were on view, which are being used for research in the matter of breeding bees immune to diseases. Another interesting experiment which is being conducted is in connection with the using of larger frames. For this purpose American hives have been purchased. The visitors were particularly interested in the Dadant and Root hives. These hives are very large when compared with our own. Mr. Joseph Tinsley, who is in charge, explained the work, and a most profitable afternoon was spent. Mr. Dickson, of Alloway, in proposing a vote of thanks, hoped Mr. Tinsley would continue his experiments."—From the **Glasgow Herald.**

We heartily congratulate Mr. Tinsley on the wide appreciation which his service to bee culture is continuously receiving.

" THE SCOTTISH BEEMASTER."

The Report of **The Scottish Beekeepers' Association** for 1919-20 is full of interesting items and clearly indicates the progress and vigour in this leading society. The report mentions that " proposals for the starting of **' The Scottish Beemaster '** as the official organ of the **S.B.A.** and its Federated Associations have been made to us by a suitable publisher, and a Publications Committee has been appointed to take these proposals into careful consideration. The issue of a Scottish Bee Journal has been long overdue, and the number of beekeepers in the country is large enough—if all became subscribers —to secure the possession of a periodical of the very first order."

We have no doubt that the organising ability and wealth of knowledge which the Rev. Beveridge and his enthusiastic colleagues command will ultimately bring this splendid proposal to successful fruition.

THE SUGAR POSITION.

A sharp decline in sugar prices would appear inevitable by the end of the year.

We learn that the Royal Commission recently concluded the purchase of 205,000 tons of Mauritius crystals, representing about 90°/o of the expected crop, at 90/– per cwt. f.o.b., while the latest rumours with regard to new crop Javas are that the planters' price will be near Fl. 45, equal to about 74s. 1½d., f.o.b.

Brazil is offering white crystals for shipment to Europe during July-September at 110/– per cwt. c.i.f.

The U.K., with stocks of 427,000 ton against 335,000 ton last year, and the large supplies still to come in from Java and other countries, is provided for some time to come.

The consumption during the month of May fell to 105,000 ton as against 165,000 ton during the same period last year.

The principal factor in the adumbrated lowering of prices is, in addition to the lessened buying power owing to the financial stringency which is making itself felt all over the world, the greatly improved prospects of the continental beet crops which, on the whole, show large increases estimated as follows :

	1920		1919
Belgium	200,000	against	145,000
Holland	300,000		240,000
France	300,000		154,000
Denmark	160,000		120,000
Checo-Slovaquia	750,000		600,000
Spain	200,000		160,000
Germany	1,165,000		750,000

BEES PER AEROBUS.

One of our advertisers, Heer van Langeveld, of Haarlem, has, we believe, the distinction of being the pioneer of bee transportation by aeroplane.

This gentleman recently supplied a skep of Dutch bees to Mr. Harwood, forwarding it per Koninklijke Luchtvaart Maatschappij, s'Gravenhage, to Croydon. The bees travelled well, arriving in excellent condition, although their journey was extended by a visit to **The Apis Club** apiary at Benson.

Were the carriage rates less expensive, this method of transport should commend itself to buyers and sellers of bees, the short time taken being a most important factor in their safe delivery.

The importation of Queen Bees by this route is still more strongly indicated, as a comparatively large number, if the cases be made up into one package, can be carried at a rate which, distributed among the various destinatories, would be so slightly increased as to be far more than compensated by the quicker delivery and unimpaired vigour of the queens on arrival.

THE LANGSTROTH FRAME.

Mr. Lockwood's article[†] on the Langstroth Frame has quickly borne fruit, inasmuch as one of the leading English firms of Appliance manufacturers, Messrs. James Lee & Son, Ltd., of Uxbridge, are already manufacturing and fitting this popular frame. We have always found the House of Lee responsive to the progress of the time and we have no doubt that ere long they will not be alone in placing the Langstroth frame on the British market.

In publishing this gratifying announcement we are obliged to refer to a guiding fact, which in the past has done appreciable harm to the cause of beekeeping in the United Kingdom. This was the tendency of the trade in general to avoid, on the one hand, the production of advanced appliances similar to those in use abroad and yet to abstain as much as possible from importing foreign goods which cannot be substituted by home products. This was in reality a non-progressive and an anti-national policy. That it has been found so cannot be shown better than by the interest of such leading firms as Messrs. Steele and Brodie in the importation and popularisation of Dadant's foundation and their manufacture of hives on American lines ; of Mr. E. H. Taylor in the importation of Lewis sections and the manufacture of the " Moneycomb," and of similar activities by other leading firms. Nevertheless, the demand for hives and appliances is far greater than the supply and many a beekeeper has to wait for weeks if not months before securing the execution of his orders. No one who has the interest of beekeeping at heart could possibly discourage under the circumstances the importation of hives and appliances to compensate for the appreciable deficiency in home production. This and the fact that imported hives were being sold at a lower price than British hives calls on the one hand for better organisation in production here, and on the other for the necessity on the part of our readers in this country for looking ahead and placing as early as possible their orders for the coming season with British firms. They will be wise by erring on the liberal side as they will never find any difficulty during the season in disposing of any surplus appliances.

ROBERT LEE, Esq.,
Chairman, Messrs. James Lee & Son, Ltd.

NEW ERA FOUNDATION.

We have much pleasure in noticing this foundation[‡] coming to the foreground and is championed even by those who, on grounds of prejudice, declared not long ago that they would not use it at any price. Mr. Baldwin is to be congratulated on a merited success, not only in regard to the success of this unique foundation but also in relation to the perfected production of the 14″ × 12″ frame, which is excellently fitted, thus disproving the view that a large frame cannot be safely wired.

[†] THE BEE WORLD, Vol. I., p. 205.
[‡] THE BEE WORLD, Vol. I., p. 89.

THE PRICE OF EDUCATION.

The following announcement appears in the August **Bee Craft**, the official organ of the **Kent B.K.A.**: "Our membership is still growing, and with it, unfortunately, the cost of printing, postage, and all those minor expenses consequent upon the Association's activities. The subscription is such a small one that our revenue does not grow in the same proportion as our expenditure. It is imperative, therefore, that our funds should be augmented, and we appeal to all who are interested in educational work, such as we are undertaking, to help by sending donations or increased subscriptions to our Secretary."

Our readers are in no need of introducing to them our excellent contemporary. We cordially endorse the above appeal. Only those acquainted with the growing difficulties of the publisher will fully appreciate the present responsibilities and worries of education. The **Kent B.K.A.** can easily enforce their revenue without appealing to beekeepers, but at the cost of curtailing their splendid educational work. **Bee Craft** is still as full as ever of valuable literature. The production of such a splendid magazine will alone account for much expenditure in spite of free co-operation. It is a credit therefore to our friends in Kent to bear a financial loss rather than curtail their activities, which will only be denied or minimised by those who have an axe to grind. At the same time such a magnificent labour of fraternal education should receive from the public the financial support which it richly deserves.

N.Z. HONEY IN LONDON.

The British Australasian comments as follows on an illustration of the fine display of N.Z. honey in the Dominion offices at the Strand, London: "The well-arranged display of New Zealand honey, on view in one of the windows of the New Zealand Offices, Strand, is attracting much attention. It has been dispatched by the **New Zealand Honey Producers' Association,** and is being handled in the United Kingdom by the **Bristol and Dominions Producers' Association.** The exhibit is so arranged that the onlooker can observe the methods of packing, both as regards individual jars and completed boxes sent out to the trade. In the foreground stands a hive of the Langstroth pattern, lent by James Lee and Son, Uxbridge, which is generally used throughout the Dominion...... Honey, unless it is pure, will not set, but judging by the open tins in the window, the New Zealand honey has never run since it was dispatched.

It is interesting to recall that bees were first introduced into New Zealand in 1839; and, after the early vicissitudes, bee farming has steadily increased. The census returns of 1916 showed that there were 8,244 households keeping bees in the Dominion, the number of colonies being 57,540."

THE HONEY CROP.

Whilst in America, generally speaking, this season's crop is good and honey is being sold at a lower price than sugar, the reverse has taken place in the United Kingdom. The season has certainly been a bad one except in very early districts, and, as we go to press it seems doubtful that late districts will gain any appreciable surplus. From all parts of the country the most unfavourable reports reach us. But at least one educational object has been attained. People in good districts who were accustomed to almost ignore their bees and boast, in spite of their ignorance of the achievements of their neglected colonies, were rudely awakened by a bitter experience, and are clamouring for sympathy and help in place of empty egotism and ridicule at the expense of others. There are many good-hearted beekeepers and no effort should be lost on their part to do the once thankless task of assisting their unfortunate friends. There is undoubtedly every indication that unless expert sound management of weak lots is done forthwith and feeding is started in earnest the death roll of weak colonies will greatly increase and we shall face a greater shortage of bees next season.

From a queen-rearing point of view the season has been a terrible failure, due to the adverse weather which has prevented virgins from mating for as long as six weeks.

We have advanced and maintained the opinion that the unfavourable weather of this country is a greater enemy to bees than I.W.D. itself and in fact the disease would not have its way under favourable climatic conditions. The 1920 season in the United Kingdom appears to have been causative of a double tragedy in no few districts: starvation and disease, including malnutrition.

IMPORTED QUEENS.

We have received from a reliable beekeeper photographs of combs showing the work of Government queens. These were simply either drone breeders or poor quality "queens." On the other hand, we have received testimonials from many others to the excellence of the queens supplied and a practical evidence is the sale by the Ministry of Agriculture of thousands of imported fertile Italian queens at a moderate price. With each queen an introduction circular lucidly written is sent out and the trouble is taken in clipping each queen before dispatch, so that in case of dissatisfaction evidence will not be wanting. We have bought one of these queens from Mr. Chamberlain, of Wallingford. On testing, it proved to be as good as any other queen which we imported. We congratulate the Ministry on the energy displayed and care taken in helping the average beekeeper in the Country in the matter of requeening and in spite of insinuations and misrepresentations from some vested interests. We have no doubt that some of the queens imported were not A.I., but it must be remembered that all these queens are untested and yet the proportion of unsatisfactory queens appears to be very small.

Signor A. Zanini.

General Manager of Bozzalla's Queen Rearing Apiaries.
Author of the illuminating article: "Italian Queens," previously published in THE BEE WORLD.

Quite recently the Expert to the Ministry paid a visit to all the Italian queen-rearing apiaries both for scrutinising the methods employed as well as for endeavouring to meet the demands of the public. We understand that 600 Bozzalla queens were recently ordered and the public are therefore assured of a high standard of queens not derived from anyone source.

DISEASED HIVES. "It is the experience of inspectors that following a very severe winter foul brood is much more prevalent than under more normal conditions. This is due partly to the weakened condition of many colonies and also to the fact that the large part of the diseased colonies of that territory were killed out during the winter, and their hives were robbed out the following spring. In order that we may avoid this condition, as far as possible, close up the entrances to all dead colonies or remove them to a cellar or to some bee-tight building where robbing cannot take place. Also see to it that your neighbouring beekeepers do this.

If this advice was really followed, it would doubtless save several thousand cases of foul brood from developing. If a colony is dead and known to be diseased there is no excuse for keeping it around. It should be destroyed at once so that no accident could happen which would permit it being robbed out."—B. F. Kindig in the **Domestic Beekeeper.**

DISCONTINUATION OF THE REVIEW OF BACTERIOLOGY. Our readers interested in microscopical studies will learn with much regret of the discontinuation of **"The Review of Bacteriology, Protozoology and General Parasitology,"** which was admirably edited by Dr. Charles Slater and Alex. G. R. Foulerton, F.R.C.S. The following communication dated June 9th reached us from the publishers at 36-38, Whitefrairs Street, London, E.C.4: "We regret that we have found it necessary to discontinue publication of "The Review of Bacteriology, Protozoology and General Parasitology." The increased cost of printing and paper makes the production of a journal with such a restricted circulation impossible at a reasonable price, and we feel that the subscription cannot be further increased." A limited number of back volumes of this valuable magazine are still available from the publishers.

THE UTILITY OF THE BROOD-HATCHING CHAMBER. "You will be pleased to hear I have introduced an imported queen by means of modified B. H. Chamber, taking one comb of sealed brood placed horizontally over the brood box, using the bottom out of your B. H. Chamber. This was put in on May 2nd and hatched on May 12th. During that period we have had very cold weather and frost at night. I placed it over a strong 10-frame stock and contracted the opening of the hive on cold days and at night. If it works so well under these conditions, which you caution against, its success under ordinary conditions is assured."—Arthur M. Sturges, B.Sc., Vice-President, **Cheshire B.K.A.**

TO-DAY IS TO-MORROW IN MANIPULATION. Sounds funny, doesn't it? But such is the fact. The work we do to-day is not for to-day, but for to-morrow, next week, or until we again look them over—which is usually ten days or two weeks. With this in mind we should so arrange or manipulate the colony that the work we are doing to-day will leave them in such condition that upon our next visit certain results may be looked for. For instance, to-day we have been putting queens in the lower storey, confining them there with an excluder. On our next visit we expect to find all brood sealed that was left above the excluder. Queen cells will likely be found in about 25 per cent. of the strong colonies where unsealed brood was left in the second storey. These cells can be used for other colonies, destroyed or left for the bees to cut down. Some beekeepers who use excluders exclusively tell me that they do not have any trouble with the cells that are drawn above excluders. As the bees hatch out the cells will be cleaned out ready for the queen to lay in—the bees not seeming to realise that she cannot get above to do so. If honey continues to come in, the bees will gradually fill these cells with honey.—L. L. Andrews in **The Western Honey Bee.**

THE MACDONALD COMB. We have experimented this season with over a hundred of these combs, Langstroth size. It would occupy pages of THE BEE WORLD to give details of experiments. The following conclusions may be of interest to our readers:

(1) We have found nothing to disprove our observations last season which were recorded at the time.

(2) We have found that, going to the extreme of utilising no more than one pound casts separately for hives, whilst mitigating against success, ultimately ending in comparatively developing nuclei. At the same time we observed that the brood suffered in single-walled hives through chilling. As this experiment is not practical beekeeping it will be ruled out of consideration.

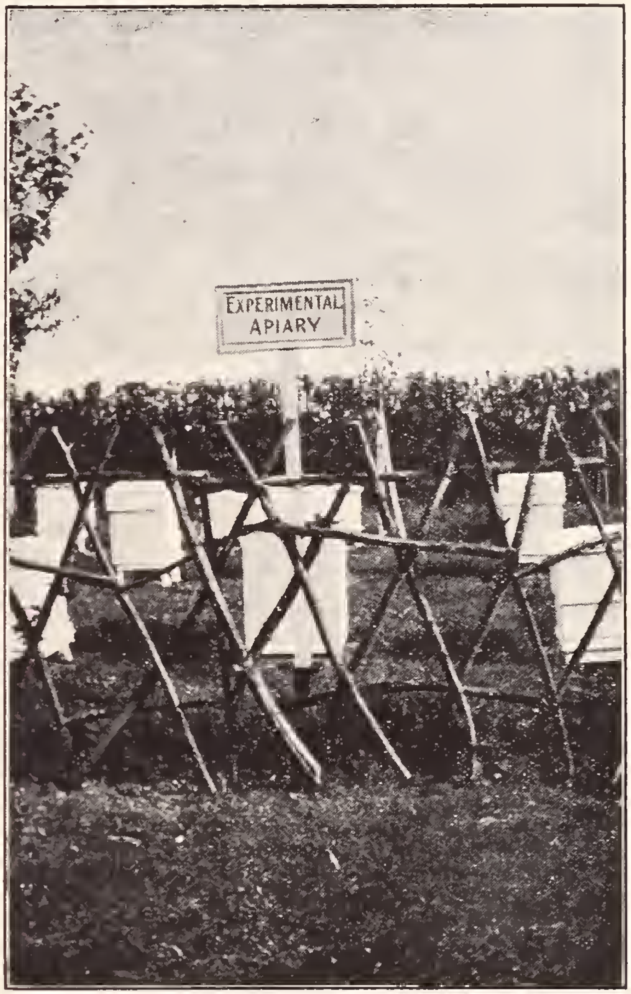

Fig. 4.—A Section of the Experimental Apiary of **The Apis Club** where fifteen colonies in different types of hives are maintained exclusively for research study.

(3) Bearing in mind that as there is much difference between skep beekeeping and modern hive beekeeping, so there is between the management of colonies on metal combs and those on wax combs, we found that the contraction of hive entrance, the utilisation to begin with of the **minimum** number of combs that are absolutely necessary, with division boards bordering them, the gradual addition of extra combs at the extremes, tending to successful development of medium and strong swarms. Expanding the brood nest by the insertion of a metal comb in the midst of already established brood combs is scientifically incorrect.

(4) For storing purposes, the metal comb proved under variable conditions a phenomenal success and no doubt it has come to stay in the super, whatever may be said against its

utility for the brood chamber in tropical and cold areas where no special insulating hives are in use. In view of this remarkable fact, even were the Metal Comb (especially an improved one) a complete failure in the brood chamber, which is far from being the case, particularly under Engilsh conditions, it is worth a mine of gold.

LUSHER'S EXTRACTING TENT.

Editor Root comments in the August **Gleanings** on an illustration of a portable extracting tent originated by Mr. A. E. Lusher, of Pasadena, California, as follows: " Unlike most beekeepers of California, he does not make use of an extracting wagon nor a permanent building for extracting at each yard, but uses, rather, a portable outfit made up of canvas and mosquito netting—something that he can fold up in a small compass, load it on the wagon with his extracting outfit, erect it on arrival at the outyard, and then begin operations. Mr. Lusher is known as one of the most extensive honey-producers of sage and orange honey in California. The last I knew he had about 1,800 colonies. He is one of the beekeepers in that State who understand Cailfornia conditions and are able to make the bees pay."

TUNIS BEEKEEPING.

The **Am. B.J.** reports : Slowly, but steadily, the bee magazines that were compelled to suspend circulation by the World War, are coming back to life. We are in receipt of the revived **" Bulletin de la Societe d'Apiculture de Tunisie,"** its 56th number published in Tunis.

Tunis, a French colony, in Northern Africa, is quite a bee country. A large bulletin, entitled **" La Tunisie Apicole,"** was published in 1912 and mentioned in the **American Bee Journal** in October of that year, with photos of a Tunis school of beekeeping. The writer and teacher, J. Georges, is still the manager of editorial activity. Success to them.

THE CALL OF THE HOUR.

Although no bee magazine in this country has ever been established before without initial subsidy or temporary financial assistance from its friends, the case of THE BEE WORLD is unprecedented, inasmuch as it appeared at a time of industrial upheaval, with endless difficulties to the publisher. Nevertheless, it has met friends in every county in the United Kingdom and in many countries abroad. Never before indeed has a bee journal, with such unorthodox policy and educational ambition, finally met with greater trust or interest, in spite of the unavoidable machinations and insinuations of some vested interests. No small credit is due to the valuable co-operation of our colleagues of the Bee Press, both at home and abroad. To them we repeat our grateful thanks.

The completion of the first volume of the magazine was a sign for an outburst of congratulations and most kind messages from hundreds of readers, including our advertisers, one of whom, for instance, remarks : " Permit me to congratulate you on the Spring Number of THE BEE WORLD. It is simply wonderful. The printing is good, the paper is good, and the information given therein is considerable. I do hope that you will succeed in making the paper self-sustained. This Spring Number gives overwhelming evidence of enthusiasm, sound knowledge, disinterestedness, idealism, in a word, all the virtues which should command success. Unfortunately in this gross materialistic age, virtue never gets into the House of Lords, nor through the golden portals of the Bank of England. However, you have the feeling of doing a good work, and perhaps in time, you will strike a responsive cord in the heart of wealthy people, who will bring forward the financial assistance which is required to maintain a paper of the importance of THE BEE WORLD."

With few exceptions THE BEE WORLD has nothing to thank the rich people for. It is the rank and file of **Apis Club** members who have shown richness in interest and character, and now that a business foundation has been established for the magazine, it is up to every one of them and to every would-be member to share in its proprietorship in whatever possible degree. Considerable difficulties had to be overcome before finally securing a unanimous vote from the shareholders of Messrs. Adminson Ltd. regarding the transformation of the Company into a public one. The reason is not far to be sought; considering that as possessors of valuable property, including one of the finest breeding apiaries in this country, and in view of the liberal support which they have given to this magazine during its first year, they felt that they are asked alone to undertake an obligation which should belong to the whole craft. There are, for instance, no less than ninety beekeeping Societies in this country alone, and if each, on an average, cared to contribute ten pounds, a substantial sum would have been found for the issue of the paper as a public property under their auspices. However, the first General Meeting of members of the **Club** was not devoid of the feeling that the paper has appeared a decade before its period, in the sense that the spirit of public service and co-operation amongst beekeepers was not sufficiently alive in this country and was likely to be misunderstood and misrepresented. This in itself however is a qualification for the importance and existence of the paper.

In the publicity section, our readers will find the full prospectus relative to the Company. It is hoped that every lover of the paper, whatever his standing may be, will do forthwith his or her **utmost** towards the realisation of its ambition. A single share for one individual will not be too small, and a thousand will not be too many, for the carrying out, from a business point of view, of the programme in hand. The shareholders are masters of the Company and its property and can do what they like with its activities as outlined in the prospectus. The conditions of subscription are made sufficiently easy to suit the means of even the humblest beekeeper.

The necessary re-organisation, having necessitated a big claim on the Editor's time, it was next to impossibility, either to deal promptly with the regular correspondence or to begin with the second volume of the paper until all preliminary preparations were completed. Through the courtesy of the **B.B.J.** a notice by the Editor duly appeared requesting readers to bear with him until the necessary business foundation is established when all arrears would be cleared, and hereby our promise is duly fulfilled with a spirit of trust in the response of all our friends and the craft in general, each unhesitatingly doing his share without waiting to see what the other fellow is going to do, as no success could ever be achieved with hesitation or timidity.

Truly, we cannot find adequate words of thanks for the noble encouragement and support which was maintained by members of **The Apis Club** even during the long weeks of our silence. Such a genial attitude assured us more than ever that our arduous labour has not been in vain.

PRACTICAL SYMPATHY.

We have much pleasure in publishing the names of donors to our funds and the amounts subscribed, as indicated in our last issue. Now that THE BEE WORLD is issued on business lines, our hope is that donations will be entirely limited to the work of the **Club** and that instead of any donations for the maintenance of the paepr, capital is invested in its development. No business visitor who has inspected its correspondence files has hesitated to express the considered opinion that, given adequate working capital, it is bound to develop rapidly into a first class magazine of a national and international importance and a sound business undertaking, since the interest in the paper is far from being limited to this country.

The following lists were compiled by Mr. H. L. Billing, Assistant Secretary to **The Apis Club**. They include only free donations. In case of any error in recording, we shall be glad to rectify this on having our attention drawn to it. Receipts were duly issued for all donations, as also for membership fees.

I.—Donations for the year ending May 31st, 1920.

	£	s.	d.		£	s.	d.
Adams, T. H.	0	2	6	Burtt, E. J.	0	13	6
Anderson, J.	0	2	6	Campbell, Lt. H.	2	0	0
Andrews, L.	0	2	6	Card, T.	0	10	0
Barnsley, J. C.	0	5	0	Cardigan B.K.A.	0	5	0
Barratt, Gilbert	1	11	0	Carmarthenshire B.K.A.	0	5	0
Bartlett-Miller, H. B.	0	5	0	Carr, W.	0	2	6
Bastin, W. J.	0	1	0	Carter, C. R.	0	7	6
Bayly, A. C.	6	0	0	Carter, H. E. C.	0	10	0
Bean, F. A.	0	5	0	Chable, E.	1	0	0
Beasley, Dr. J. G.	0	10	6	Claridge, F. M.	0	1	0
Behman, B. F.	0	5	0	Cowan, T. W.	3	0	0
Bellers, Lt. H. H.	1	19	6	Cunningham, J.	0	2	6
Beveridge, Rev. John	0	3	0	Daltry, H. W.	0	10	0
Bliss, E.	0	5	0	Danby, C. W.	0	5	0
Bouch, J.	0	2	6	Darlington, A.	0	1	0
Brocklehurst, G. D.	0	12	6	Dean, V. R.	0	10	6
Brooker, A. W.	0	5	0	Devenhill, W.	0	5	0
Burgess, Rev. N.	0	12	0	Dia, Dr. M.	1	1	0

	£	s.	d.		£	s.	d.
Doupe, Rev. R.	0	10	0	Newman, T. F.	1	0	0
Dutchman, R. H.	0	3	0	Northumberland B.K.A	0	15	0
Ellis, J. M.	0	5	0	Nutt, A. W.	0	2	6
Ellison, Major	1	0	0	Orme, E. S.	0	10	0
Elsworth, Capt.	0	5	0	Parrington, R.	0	5	0
Evans, Rev. A. A.	0	5	0	Parker, W.	0	10	0
Fielden, D.	1	0	0	Pattison, J. A.	1	0	0
Fletcher, J. S.	0	5	0	Price, J.	0	5	0
Fraser, W. J.	0	15	0	Prothero, J. H.	1	14	6
Fry, A.	0	5	0	Read, M. H.	0	2	6
Galland, T. K.	0	5	0	Robertson, F. C.	0	2	6
Gee, J. P.	1	0	0	Robinson, Miss N. M.	1	10	0
Gould, C. E.	0	10	0	Rylands, Rev. B. I.	0	4	6
Guthrie, P. C.	0	5	0	Sawyer, G.	0	5	0
Hawkins, W. T.	0	13	6	Shaw, H. S.	0	15	0
Hayes, G.	0	5	0	Smith, G.	0	5	0
Helbawy, H.	0	15	0	Spencer, E. M.	0	5	0
Hill, W.	0	2	6	Spiller, C.	0	2	6
Holt, T.	1	7	6	Stevens, A.	1	11	6
Hulbert, J.	0	5	0	Stigant, S. A.	0	10	0
Humphries, W. H.	0	2	0	Stich, H. M.	0	5	0
Jacob, E.	0	7	6	Stokoe, W.	0	5	0
Jacobs, J. R. H.	1	7	0	Stubbs, H.	0	10	0
Johnson, F. W.	1	0	0	Swift, W.	0	5	0
Johnson, Miss M.	1	0	0	Taylor, E. H.	2	18	0
Jones, C. R.	1	0	0	Thomas, W. J.	0	5	0
Kay, G.	0	15	0	Thomson, Major H. M.	0	10	0
Kelsey, Capt.	0	10	0	Toms, N. S.	0	10	0
Kennedy, J.	1	0	0	Vile, F.	0	10	0
Kettle, J. J.	0	10	6	Walford, L.	0	13	6
Kidd, J. N.	0	10	0	Walker, J. G.	1	1	0
Lockwood, J. E.	0	12	6	Watt, M. K.	0	10	0
Loane, J.	0	10	0	Weaver, Miss	0	10	0
Lloyd, C. T.	2	0	0	Whealler, E. S.	2	2	0
Madoc, E. W. D.	1	3	6	Whiteley, Dr. H. W.	4	12	6
Mallander, W.	0	2	6	Whyte, R.	10	0	0
Manley, R. B.	5	5	0	Williamson, J.	0	10	0
Mannox, Mrs.	0	10	6	Wood, A. H. E.	25	0	0
Martin, Miss	0	7	6	Wright, W. A.	0	10	0
Metcalfe, T. A.	0	0	6	Sheffield B.K.S.	1	1	0
Millard, R. W.	0	0	6	Walton, F. W.	1	1	0
Mitchell, Mrs. G. B.	0	5	0				
Moir, J. W.	2	15	6	Total	£122	15	0
Morgan, H. S.	0	10	0				
McLallam, Rev.	0	5	0				

II.—Donations since May 31st, 1920.

	£	s.	d.		£	s.	d.
Betts, Miss A. D.	0	10	0	Fielden, D.	1	0	0
Bellers, Lt. H. H.	0	10	0	Fraser, W. J.	0	5	0
Bliss, E.	0	2	6	Guthrie, P. C.	0	5	0
Bozzalla, Enrico	5	0	0	Johnson, Miss M.	0	9	6
Carlton, F. H.	0	18	0	Mitchell, Mrs.	0	4	6
Daltry, H. W.	0	7	6	Richardson, Rev. W. H.	0	4	6
Dervishian, M. G.	0	9	0	Shaw, H. S.	0	2	0
Dron, Rev.A.A.Stewart	0	7	0	Spencer, Sir Ernest	5	0	0
				Total	£15	14	6

Donations received too late for acknowldgement in this issue will appear in a following number.

DANISH BEES.

Mr. H. E. C. Carter, one of our well-known members, informs us that he has successfully imported Danish queens and a nucleus of Danish bees, the latter however suffering in transit through inadequate ventilation. The bees have some resemblance in appearance to Carniolans, though not clinging closely to the combs. They proved to be very industrious and exhibited snow-white section cappings. Mr. Carter does not speak favourably of the Danish frame on account of its short ends which he finds inconvenient in manipulation. The frames are spaced above on the Hoffman principle and have in addition at the bottom corners cross pieces acting as additional spacers.

GRADING HONEY IN WISCONSIN.

The following news item from **Gleanings** is of interest to British beekeepers in view of the recent discussion of its subject matter in the **B.B.J.** by Mr. Claridge and others: Rules for grading honey have been established in Wisconsin and will go into effect on August 12th. According to these rules every sections of comb honey and every can or other container of extracted honey sold must be stamped or labelled with the grade, colour of the honey, and a number showing the producer or packer, or else marked "ungraded."

A LABOUR OF LOVE.

The Carmarthenshire B.K.A. have most kindly shown an exceptional interest in propagating the aims of **The Apis Club** and enforcing its membership in the county. They devoted no less than a full page in their excellent annual report to the Cause of the Club with the following footnote: "This space has been presented by the **Carmarthenshire Beekeepers' Association** in the interests of this National and International Institute, which is growing into a most powerful federation of beekeepers for a forward movement, based on scientific research, education and industrial co-operation. The Association has an official membership in the Club, and is highly interested to see it thoroughly representative of this county." The report figures amongst the best reports of beekeeping societies which reached us this season.

THE STUDENT TEACHER.

Mr. W. S. Pender, the learned editor of **The Australasian Beekeeper**, has been conducting a long tour in the States for study and pleasure. Other known apiarists have acted similarly in other countries. This imbibes us with the hope that the time is not distant when an interest amongst beekeepers in international excursions will be aroused. It would mean much in the way of enlightenment and comradeship.

THE METAL FOUNDATION.

The following circular was issued by Messrs. James Lee & Son, Ltd., at the beginning of June: "In view of the fact that we have taken special pride and interest in the development of the Metal Foundation and the Detachable Metal Comb (both of which are valuable inventions evolved in this country), we beg to inform you that although we are unable at present to proceed with the production of the former, we are still doing our best to avert a disappointment.

The makers of the mill have not followed our specifications, and the machine produced is not capable of embossing anything approaching worker cell foundation. Only comparatively few experimental sheets have been produced for testing. These have not gained the approval of either the inventor of the foundation, or the designer of the mill, nor of the customers who tested them, and attempts are being made at present to rectify the mill if possible, since the foundation produced by it is cruder than even the original crude specimens. Should we succeed in rectifying the machine, our customers are in no need of our assurance that they will be fully gratified. On the other hand, if it is found necessary that a new mill has to be made, we propose to proceed with the production of a different type of Metal Foundation, which we have confidence will prove to be a still greater compromise between the complete metal comb and the wax foundation. This, however, may not be on the market in time for this season. But as many customers are requesting us to reserve their orders, we are issuing this circular with a view to ascertaining the wishes of all our customers interested in the development of these progressive inventions, relying on our business methods that they will be given full value for their money and will receive in addition special consideration because of their precedence, and relying at the same time on their co-operation to achieve this object as early as possible."

It is gratifying to learn that the difficulties of production have stimulated greater interest in this invention. Enquiries for supplies from almost every country in the world where modern bee culture is practiced are available. The narrative of trials which G. M. Macdonald passed through is recorded in this issue of THE BEE WORLD under "Odds and Ends Concerning Bees," and will indicate to the reader the difficulties and disappointments which seem to face almost every inventor before final success is achieved for his work.

THE AMERICAN HONEY PRODUCERS' LEAGUE.

We read with much surprise in **Gleanings** a communication from Mr. E. S. Miller, of Valparaiso, Ind., which indicates that even in the States a powerful and progressive organisation such as the **Am. H.P.L.** is not escaping a campaign of misrepresentation. With the advance of knowledge on the other side of the Atlantic, such a practice is hardly to be noticed and is not to be expected. But it seems that some vested interests have the same temper and methods all the world over, utilising as their tools the irresponsible friends of those whose power and progress they selfishly and foolishly fear. The writer says: " While the new National Association, the **American Honey Producers' League**, is an organisation of beekeepers, for beekeepers, and by the beekeepers, it must not be assumed that it will be antagonistic to any dealer or manufacturer who is willing to co-operate in bringing about better beekeeping and marketing conditions. However, it is well to be on our guard against any propaganda issued for the purpose of spreading dissension in our ranks. That such propaganda is being sent forth by one or more individuals, working ostensibly in the interests of beekeepers, but, it is believed, really for the advancement of outside interests, is a fact which should not pass by unnoticed. Statements that the League is " impracticable," " visionary," and " illegal," together with prophecies of failure, should be considered carefully with respect to their source and the reasons back of it all. It is quite certain that it does not originate with bona fide beemen who understand the nature and purposes of the League.

Beekeeping, it seems, is about the only important industry which remains yet unorganised, and it is evident that the time is now opportune for a natural organisation of actual producers. The fact that the meeting at Kansas City was attended by delegates from 25 or more State and regional associations, representing more than half of the commercial beemen of United States, that the utmost harmony prevailed, and that the action of this meeting was unanimously endorsed at the Buffalo meeting, † are proofs that there is a demand for an effective organisation.

Let us understand fully that it is not an object of the League to form a nation-wide selling agency, as claimed by its detractors in spite of repeated denials, but its purpose is to assist all member associations in whatever activities will benefit the membership and the industry in general. Read again the objects as set forth in the first League bulletin: Better distribution, legal aid, uniform equipment, beneficial legislation, a secretary not three days, but every day in the year, crop reports, advertising. We cannot afford to turn these down. The League will be what the beemen make it. If the constitution is defective it can be amended. If the officers do not properly represent us, we can elect others. There is nothing gained by staying out and criticising those who are labouring to improve existing conditions. The fellow who stands back and prophesises failure is not a friend of progress, and for us to give ear to false criticism and propaganda of interested parties is not the part of wisdom. Of course, the League, in order to succeed, must have the moral and financial support of beekeepers, for without this it will be powerless to carry on its work. Let us get in line for the League, for now is the opportunity of a lifetime to put the industry on its feet."

THANK YOU MR. "SPYGLASS"! The following unique observations appear in the August numbers of our excellent contemporaries, the **B.K.G.** and **I.B.J.** They clearly show that precious spirit of fraternity and co-operation amongst beekeepers of which Mr. Manley speaks in the **B.B.J.** Our friend comments on the official report of the first Annual Meeting of **Apis Club** members as follows: " the report is a depressing one but not unexpected. I really am grieved to read of a loss of £900 in so short a time, and my sincere sympathy goes out to the promoters. The venture seemed to me all along to be too ambitious, and I doubted that a paper so costly could be made self-supporting in these countries, especially with other excellent and long-established papers in the field."

It is a pity that Mr. " Spyglass " has not declared his identity, so that his admirable hint may be of greater value to the apologists for not investing in THE BEE WORLD. We reciprocate his kind sympathy.

THE AMERICAN BEE JOURNAL. The July **Am. B.J.** contains an illuminating article by Dr. G. F. White on his recent research on foul brood which deserves careful study. The journal is available in this country, and no few of our readers subscribe to it, either direct or through Mr. E. J. Burtt, of Gloucester, or Messrs. Steele and Brodie, of Wormit, both firms being specially interested in popularising bee literature. Not a number is issued which is not full of valuable information and technical advice which is unsurpassed. Yet our leading contemporary which is the oldest bee journal in the English language, always conscious of the non-limitationof knowledge and enterprise, just as it is conscious of its power, unhesitatingly quotes from other bee magazines of every nationality and does not fail regularly to emphasise that no literature can ever be complete in itself. Free from commercial egotism, the **Am. B.J.** has repeatedly drawn attention to helpful contributions in other bee journals such as **L'Apicoltore** and THE BEE WORLD. We are indeed proud of its quotation from this magazine and of the repetition of its encouragement. It most kindly presents us with this fragrant bouquet: " we have never seen a bee magazine with so much ' meat in the cocoanut.' We are not in the habit of doing any advertising for anybody, not even for ourselves, in the reading columns. But we believe this magazine should be sustained."

A TRADE DEVELOPMENT. We understand that Mr. E. H. Taylor, who is credited with possessing the largest bee appliance factory in Europe, has consented to the transformation of his firm into a big company. We tender to him our congratulations, and trust this will be the beginning of a still greater trade development in this country on improved lines.

FERMENTED HONEY. The fermentation of some samples of honey give the New Zealand beekeepers some concern. I saw a considerable quantity that had accumulated. Steps were being taken to reduce it to a consistency that will arrest fermentation. Some six tons are to be boiled in vacuum. The question is:—(1) Will the reduction stop the development of the ferment germ? (2) Will the flavour of the ferment remain? (3) Will the process be too costly, and (4) What will the value be after treatment? It will be quite possible to boil honey in a vacuum at a temperature of less than 100 deg.Fahr. Water will boil at 90 deg. Fahr. in vacuum. This process of boiling to cause evaporation is adopted in sugar boiling and condensed and dried milk manufacture, and should be a splendid means for extracting moisture from unripe honey. If the cost of the plant were not so great we might have the advocates of extracting unsealed honey erecting such plants and reducing their honey to a standard density immediately it is extracted.—W. S. Pender in **The Australasian Beekeeper.**

DR. RENNIE'S RESEARCH. We would draw special attention to the review of Dr. Rennie's research on I.W.D. in " Our Book Shelf " Section. We understand that good progress is being made, and shall be happy to duly record results. The thanks of the Craft are due to A. H. E. Wood, Esq., of Glassel, who has rendered and is rendering an invaluable service to the cause of modern bee culture by his encouragement and patronage of several schemes of research and education.

" THE WESTERN CANADIAN BEEKEEPER." This is the title of a bright new magazine published monthly at Vancouver, British Columbia. We wish our contemporary the best of success.

FRATERNITY. It is with immense pleasure that we report on another page the proceedings of the **South Western Counties' Convention** of Beekeepers organised chiefly by our distinguished member and friend, the Rev. E. J. Bartleet.† Nothing but the excessive pressure of a hundred and one duties would have prevented us from responding to the honour of a repeated invitation when the cause of the meeting is the very cause of the **Apis Club Movement**: Fraternity and co-operation amongst beekeepers. It is to the credit of the Rev. Bartleet and his colleagues that they have succeeded in breaking the vicious circle of partisanship and commercial egotism in their districts by the creation of a respectable Convention with the spirit of concord and education as its leader. Who will deny that the establishment of such conventions is a big step towards uplifting the dignity of British beekeeping by eliminating the unhealthy spirit of party strife? Even those who have kindled it are ultimately bound to bow their heads to the new spirit.

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† THE BEE WORLD, Vol. I., p. 229.

† For earlier references see THE BEE WORLD, Vol. I., p. 145.

HELPING STARVING AUSTRIA.

Having brought their invaluable work in France to a successful termination by the establishment of a sound organisation, apart from the help directly rendered, the **Society of Friends** have now directed their attention to starving Austria, one of the living tombs of Europe. The position there is so bad that with all its good will and best endeavours the Society finds itself almost without the necessary resources and is trying to save the children first. It is a terrible state of affairs. We record with pride that British beekeepers who believe in Humanity have not failed to render a fraternal service by communicating with the veteran beekeeper, Mr. Franz Richter (of Kolumbusgasse, No. 7, Vienna X), who is thoroughly acquainted with the English language and who is described by Mr. Harwood, the reviewer of his brilliant book, as the " Cowan of Austria." Others have been communicating with Mr. Graham Burtt, of Gloucester, whose unselfish work cannot be praised too highly. Unfortunately we learn from several English beekeepers who champion the best traditions of the English race in words such as the following : " the Society of Friends are only touching the fringes of the distress. As an example of this in Vienna, the milk supply before the war was 900,000 litres, and this has now dropped to about 40,000 litres !" Even with the ten wars which are still raging in different parts of the world, Humanity will never lack kind hearts.

BEE STING LEADS TO A LAW SUIT.

As a result of a recent law suit through bee stings the conclusion is drawn that if the inhabitants of any town district can collectively complain of the nuisance of bees kept within their neighbourhood, the owners would be probably required to remove them without being given the chance to have a different race of bees.

THE B.B.K.A.

A writer whose name is not in our register and does not even figure in the 1918 membership list of the **B.B.K.A.**, preaches in the **B.B.J.** the following sermon : " Many undoubtedly agree with you, Mr. Editor, and like myself are greatly surprised at Mr. R. B. Manley's great want of perspicacity. While agreeing with him on some points, such as ' experts,' and everybody patting one another on the back, he doubtless forgets, or does he know the hard, uphill struggles of the **B.B.K.A.** ? And while preferable to have a more live and instructive Association, one must not forget it is not run as a Philanthropic Association. Where would beekeeping be to-day in this country if it were not for the **B.B.K.A.** ? May be Mr. Manley, along with other detractors, prefers a so-called live club with a huge debit balance, which like others would fizzle out after a year or so."

Thanks indeed to his aloofness and that of his like, our first year ended with a big debit balance, yet **not a single member has been liable for more than his membership fee,** and we have been neither playing nor idle ; our work speaks for itself. When the service which the Editor of THE BEE WORLD has found it his privilege to render to the Craft, at the cost of driving him almost to the workhouse, has to be reviewed, it is found to merit by such a correspondent a kick in the back in the form of the insults which the **B.B.J.** publishes. Were their correspondent sincere in his writings, he should have not failed to support the **B.B.K.A.** in a tangible form, in the first place by his active membership and to have rendered to **The Apis Club** his whole-hearted support when it is encouraging and expanding the progressive principles of the **B.B.K.A.** But God forbid ! He is not for philanthropy nor for a labour of love. He is not an idealist or an educationist. Does he then really believe in all seriousness the irresponsible opponents of the **B.B.K.A.** that it pays to flatter it for some advantage ? He talks about the uphill struggles of the **B.B.K.A.** which *were* conducted by very few men indeed, like Cheshire and Cowan, and with the same voice he sneers at those who have a most uphill struggle to contend with and who have to fight the misrepresentations of the opportunists in every direction. He asks : " Where would beekeeping be to-day in this country if it were not for the **B.B.K.A.** ?" Presumably he means by the latter its Council, since the membership of the Association is far from being limited to it. British beekeeping would indeed be in a far more progressive avenue with a better Council. Does he want to be on it ? Having been honoured not only by indifference but by active opposition and misrepresentations from some members of the Association's Council, it is beneath us to share in the voting for the elections. But what excuse have the grumbling members and what right have the non-members to criticise ? Mr. Manley has been conducting recently an unfair campaign of criticism against the Association which appears as nothing short of an unconscious gratification to those people who have an axe to grind against the Association. Yet, as a member, he has not voted against a single Councillor, nor has he asked them why, if they cannot expand their work, do they refrain from giving a good example (as the **Scottish** and several other Associations, apart from many leaders of the **B.B.K.A.** itself in their individual capacity, have shown towards **The Apis Club**) by supporting in whatever possible degree, those who have not hesitated to put the heavy burden on their shoulders ?

With our membership list growing more than ever, in spite of our repeatedly announced difficulties, we have every reason to be proud of the life in our organisation. Of course, we need have no official organ and render far less service and have a substantial financial credit and then we shall merit greater respect from small minds ! What wonderful excuses do those who fail to render what is dutiful discover for hiding their shame.

THE SUPER-LOYALISTS AND SUPER-PATRIOTS.

It is with great regret that we have to refer to this subject again after our last editorial. (Vol. I., p. 189). Unfortunately a big campaign of misrepresentation by those who are greatly interested in the maintenance of party strife and commercial intrigues is being actively conducted. The " super-loyalists " are of course the " spyglasses " and " spywhistles " of the **B.K.G.** and the " judges " of the **B.B.J.**. Such clumsy tools are set to work, consciously and unconsciously by the " super-patriots " who, having infested almost the whole of a county with disease, are remonstrating with the Government for their helpful re-stocking scheme and are throwing with all their might empty shells at the Government Expert, the best abused man in England, for ignoring the wonderful immunity in the Native Bee, which they have just discovered ! Of all philanthropists and educationists, they are the people to eradicate I.W.D. and are anxious that the Government should clear the road for them and provide them with the customers.

We remarked before that when leading apiarists abroad express their surprise at the standard of beekeeping in Great Britain, which is foremost in many other industries, they should remember that it does **not** lack the beemen nor the flora, but that through the faulty attitude of its Bee Press in the past, it has encouraged the development of an army of intriguers and trade canvassers instead of co-operative reformers. The inauguration of **The Apis Club** and THE BEE WORLD was indeed a shock to them and a defeat. Their remnants, always incapable of construction, having failed in influencing the public, are applying their mischief to our members by endless and poisonous discrediting suggestions cloaked in pseudo-friendly manner. These take a wide range and may ultimately embrace the beneficial advice of how we should stamp our wrappers ! There is a false rumour that they succeeded in converting one member. All that we need say is that if we have a hundred such opportunists, and not only one, they are welcome to all of them.

We do not blame these good people for their miserable game. They walked in their own funeral by walking prematurely in our own. The time has come now, however, for us to rely on ourselves.

Our members can give an adequate answer to these insults only by supporting to the **maximum** of their ability this paper in the shape of the requested investment, by enlightening more beekeepers and increasing our membership, and by doing their utmost to augment our publicity section.

THE SEASON IN IRELAND.

The Season in Ireland has not been a contrast to the English and Scottish Seasons. From all parts of the country the same sad experience of forlorn hope is related with very few exceptions. Our readers are advised to be on the safe side and prepare for a severe and prolonged winter, in spite of the optimistic reports of some meteorological experts. We greatly fear that the losses of this season and the insufficient attention given to bees by inexperienced beekeepers or by those accustomed to carelessness through residing in favourable districts, will result in a shortage of bees next season.

The Rev. R. Doupe writes from Ireland as follows :

" This has been an adverse season for bees, and at the end of June bees were, generally speaking, at about the stage they usually reach in May of a normal year.

Crops were late and blossoms consequently scarce in Spring at the time they ought to help the bees to extend operations, and break away from the winter cluster. It will not be a good year for honey, and it is even poorer for queen rearing, although bees have advanced rapidly at intervals, rain, cold, or storm has thrown colonies back. It is one of those seasons when judicious feeding might be carried on late even into what ought to be summer, for though strong stocks will live, weak lots may go under. Quite a number of colonies died of starvation in the spring, more by far than in other years, due of course to want of care, and as a natural sequence want of sugar, as it was obtained with difficulty and delay.

Personally, I prefer honey feeding and had no other bee food until May, yet some small lots did very well, even those that only crowded three frames in winter are now strong colonies. It is a good year for white clover, but the bees are very seldom on it, due probably to want of hot weather, as it does not seem to secrete nectar unless the temperature is fairly high and of course when rain drops all on the blossoms, bees cannot get the nectar.

Swarming is raging in some apiaries which I consider results from want of space and also from want of forage. I have reason for the second assertion and may say more about it at a later date.

Generally speaking, so far there has been a very poor return of honey, but the beekeeper who allows two brood boxes, or the equivalent of them, will most likely have a fair return.

Judging by present conditions, near the end of July, there is a good prospect from late summer blooms, especially heather, and those beekeepers who have taken the trouble to prevent swarming will be well repaid in honey by strong stocks."

INDEX TO VOLUME I. With this issue the Index to the first volume appears and will be appreciated by our readers. A perusal of it will show the wide range of subjects covered, the great interest shown towards the paper by many sections of beekeepers at home and abroad, and the educational servicewhich it has already rendered in more than one direction, meriting to be copied even by those who attempt to belittle its standard.

Those beekeepers who have been hesitating to risk their few shillings, acting on the sound advice of the timid and selfish, were faced with the completion of the first volume as an accomplished fact and were sorry for their timidity when finding back issues of the magazine entirely out of print. The ever-increasing demand for the paper will make this result more pronounced with the second volume and there is no question of a second edition of any issue. In fact the difficulties of the publisher are growing to such extent that it is miraculous for a new magazine to maintain and even improve its standard, when such a well-known publisher as Mr. John Murray is contemplating printing in Holland, in view of the excessively high cost of printing and paper in this country.

Dear Reader, you pay half-a-guinea for the membership of the **Club** and you get at a loss to us a paper which is worth more than your fee. **It could be made not only self-supporting, but a profitable business proposition if YOU would enlist the sympathies of ten other beekeepers.** The good hopes for THE BEE WORLD would not then be prospective but **immediate.**

HISTORY OF THE I.B.K.A. The concluding instalment of the history of the **I.B.K.A.** from the able pen of its Secretary, Mr. M. H. Read, M.A., now appears. The type is held in reserve till the end of October in case there will be sufficient demand for its reprint in a book form. Needless to say, the history of the **I.B.K.A.** is the history of the development of modern bee culture in Ireland, just as the **B.B.K.A.** and **S.B.K.A** are responsible for much of the good work done in England and Scotland respectively.

Our pages have already been graced by an instructive historical article from our friend, the Rev. Beveridge, M.B.E., on the valuable services of the **S.B.K.A.** since its creation; and we hope to publish in due course an illuminating Summary of the history of the **B.B.K.A.** from the pen of the veteran leader, Mr. Thomas William Cowan, who will also be contributing the detailed history in due course to the **B.B.J.**

The Arena: Letters to The Editor.

Criticism is a disinterested endeavour to learn and propagate the best that is known and thought in the world.—MATTHEW ARNOLD.

THE MODIFIED-DADANT HIVE IN THE U.S.A.

To the Editor of The Bee World.

DEAR SIR,—In the name "Dadant," beekeepers throughout the world may conjure up a vision of a great family, teachers of better beekeeping methods. In the Modified-Dadant hive beekeepers may similarly materialize Dadant methods, since this hive, introduced to American beekeepers for the first time this year by Lewis, embodies the scientific principles of their methods. It is the culmination of Dadant experience with hives.

The Dadant apiaries are located on the Mississippi river bottoms in the state of Illinois over 1000 miles inland from New York City. Their location is not the best and frequently whole apiaries must be moved to secure sufficient honey to winter them. In the face of these adversities the Dadants have secured in several different years, honey crops of many tons, together with bee increase, leaving all colonies in good shape. This was done with the Dadant hive, similar to the Dadant-Blatt, well known on the European continent, being sold in America this year as the Modified-Dadant hive. However to those who know the family, one sees it was mostly done by the better beekeeping they practise.

George S. Demuth, foremost American teacher of beekeeping, says: "Any method of forcing the surplus of young bees out of the brood chamber to other parts of the hive, tends to prevent swarming." This principle is an axiom of better beekeeping and all beekeepers know the bane of swarming, especially in excess. Let us see what the Modified-Dadant hive tends to do to remedy swarming.

Frames are spaced one, one-half inches at the end bars, to give 170 more cubic inches space in the 11-frame Modified-Dadant hive, than in the "Standard" 10-Hoffman-frame American hive. Thus the congestion is reduced and swarming with the Dadants has averaged for years less than two per cent, without an hour being spent by them in swarm prevention methods. There are 11 frames in the Dadant hive, of "Quinby" depth, 11¼ inches deep. These supply sufficient room for the most prolific queen and honey for her brood, as well as honey enough for wintering strong colonies of bees, without additional brood room and in one storey, practically without swarming.

American beekeepers have too frequently tried to remedy their own beekeeping shortcomings with new paraphernalia, until new paraphernalia is usually a bane on the market. When manufacturers and practical beekeepers, like the Dadants get together, the scientific principles and practical results of their Modified-Dadant hive should appeal to beekeepers throughout the world, wherever beekeeping adversities are similar to those on the North American continent.

Quoting from Dadants' booklet, "The Jumbo body as sold in this country and in Europe fails to take the place of the Modified Dadant hive, as it only contains 10 frames and does not have the 1½ inch spacing."

Yours faithfully,
KENNITH HAWKINS.

Watertown,
Wisconsin, U.S.A.

THE WEIGHT OF THE BEE IN RELATION TO FLIGHT.

To the Editor of The Bee World.

DEAR SIR,—May I be allowed to comment on a point raised by Miss Betts in her review of Pastor Gerstung's book, in your March-May issue?

Miss Betts describes as a "hoary fallacy" the statement that "a bee about to fly can make an appreciable difference in her weight by inflating her tracheal sacs." Now, this statement has been for years, and is still, accepted as fact by many authorities, and until it has been definitely disproved, it is as useful as any other well-founded assumption in explaining certain otherwise inexplicable phenomena. It is not in line with the spirit shown in Miss Betts' able and original contributions to bee-science elsewhere, to carelessly cast aside a working hypothesis without providing an efficient substitute, and her action betrays a want of that circumspection which one would expect from a lady with a good scientific training. I am assuming, of course, that she has not herself, and knows of no one who has, experimentally disproved the statement in question. If I am wrong, I apologise, and should be delighted to be furnished with references to accounts of the experiment.

I believe, however, that experiment, were it possible, would confirm and not confute the " fallacy." Reasoning on physical principles as they are known to me, I should state with confidence that a bee with her tracheal sacs full of air is **bound** to be less in weight (using the word, as it is used in dynamics, to mean the pull of gravity) than the same bee with these sacs collapsed. But the conditions here are not precisely the same as in the case of, say, a child's balloon. The weight of the latter remains the same whether it is empty or full of air ; in fact, when full, it would be heavier if weighed in a vacuum. But with the bee, there is the factor of temperature to consider. The air in the tracheal sacs may be anything up to 30° F. above the temperature of the air in which the bee is flying, and the net result must be a decrease in the bee's weight in air, provided, of course, the temperature of the latter is less than the temperature of the bee.

Miss Betts will not, I hope, hedge by an unreasonable interpretation of the word " appreciable." Who are we to say just what amount if difference in weight is appreciable to the bee and makes flight possible or otherwise ?

Can Miss Betts explain without recourse to the " hoary fallacy," why a bee dislodged unawares from a comb or from anything else on which it has been for some time quiescent, is almost invariably quite incapable of flight for a few seconds, after which it can fly perfectly ?

Might not the " fallacy " also explain why sometimes a chilled bee, sufficiently revived to be able to run and " buzz " energetically, may yet be unable to fly ?

Yours faithfully,
DELTA S.

[Miss Annie D. Betts replies to the above letter as follows :

I am very glad that " Delta S " has given me an opportunity of stating my reasons for calling the theory, that a bee can make herself appreciably lighter by inflating her tracheal sacs, a " hoary fallacy."

The weight of a bee is a variable quantity, but a good average value is 0·0002 lbs., or 5000 bees to the pound. Her volume uninflated is about 0·0000081 cu. ft., as far as my rather rough measurements go. This works out at 24·7 lbs. per cu. ft., which seems of the right order of magnitude.

Now, assume that the bee can double her volume by inflating her sacs. (This is probably an exaggeration, but I wish to give the benefit of the doubt to the opposition). Her weight, inflated, will therefore be

0·0002 lbs. **plus** weight of 0·0000081 cu. ft. of air at 34° C. (the bee's body temperature), **minus** weight of 0·0000081 cu. ft. of air at 16° C. (air temperature). That is,

$0\cdot0002 - 0\cdot0000081 \times 0\cdot0765 \times (1 - \frac{289}{307})$ lbs., since air at 16° C. and standard pressure weighs 0·0765 lbs. per cu. ft.

The decrease in the bee's weight is therefore $0\cdot0000081 \times 0\cdot0765 \times 18/307$ or 0·000,000,0364 lbs.

Or, to put it in a more comprehensible form, 0·000182 of 0·0002 lbs.

That is, a decrease in weight of less than the 1/5000th part. " Delta S " will, I think, agree with me that it is fair to call this inappreciable. The bee may be able to detect this small decrease, but that does not render her any the less subject to the laws of physics and aerodynamics, as is every kind of flying machine. A bee, in fact, is a heavier-than-air craft ; an aeroplane, not an airship. She inflates her sacs, not in order to make herself lighter, but to provide for the better aeration of her blood during the strenuous exercise of flying. This explains why a suddenly dislodged bee " goes down out of control " for a short time, instead of being in a condition to fly at once. It may be observed that I never denied the **fact** of the inflation, but only the **explanation** of it commonly given.

I have the utmost respect for the authorities referred to by " Delta S " ; but, had they been as familiar with aeronautical matters as with beekeeping, I venture to think they would have come to a different conclusion on this topic.]

SCIENTIFIC BEE CULTURE.

To the Editor of The Bee World.

DEAR SIR,—" At last " we have a real scientific and up-to-date Bee Journal. That your publication has tackled the higher plane of our industry is to me a matter of great satisfaction. I should like to be able to express all that I feel regarding it, but if I put my sympathy in a practical form, in the shape of the requested assistance that will be much to the point !

I am applying the science of **Genetics** to the breeding of bees as distinguished from mere rearing of queens. I have Prof. W. E. Castles, of Harvard, coaching me and just at present have about three years of research work ahead upon his suggestions.

I daresay you are aware that, in Australasia, beekeepers in general have a very whole-hearted contempt for the methods employed in England, in honey production. That this is deserved I am **not** at all ready to admit. I am aware that the " vocation " in the British Colonies has been with few exceptions an avocation only at Home, and that mostly ignorant and prejudiced people have had to do with the industry. It is all very well to belittle the small dimensions of the blacklotter's few colonies of bees, when one counts his bees by " yards " rather than by hives, but what kind of success would those same braggarts materialise if their operations were suddenly transposed to same conditions of climate, breed and custom as environ those whom they profess to condemn ? You and I know full well !

Sooner or later we too shall have to combat diseases to which now we are entirely immune or rather strangers. **Then** we shall hear a howl of utterly helpless, but none the less contemptible, ineptitude, the habit of taking the advantage of our beneficent climate at its very greatest limit of generosity. Result : bees weakened by acclimatisation to such an extent as to be unable to resist whatever of new and unexpected maladies may eventually happen along.

Yours faithfully,
H. BARTLETT BARTLETT-MILLER.

Thorough Work Apiaries,
Kihikihi, N.Z.

TEAM WORK IN BEEKEEPING RESEARCH.

To the Editor of The Bee World.

DEAR SIR,—Many of the problems of modern applied science are " borderland " problems ; that is, they touch on the domain of two or more sciences. Obviously, the solution is most likely to be found by two or more specialists in these different domains working together. Other investigations, again, are necessarily carried on by means of observations in widely-separated localities. In all such researches the co-operation of several workers is a necessity, as is more and more recognised at the present day.

The problems presented by the Craft of beekeeping are many of them of this nature, involving as they do a knowledge of entomology, botany, chemistry, physics and meteorology, and occasionally of other branches of science as well. Let us consider a few of the unsolved problems which might with advantage be attacked by team-work methods.

The conditions governing Nectar-secretion.—This is a subject about which very little is known. An exhaustive research involves a knowledge of botany, chemistry and physics, at least ; and would probably necessitate a thorough investigation of the physiology of the plants concerned. The nature of the soil plays a great part, and introduces additional complications.

Meteorology as affecting beekeeping.—Though use might be made of the data collected by the Meteorological Office, beekeepers need to make observations for themselves of the beginning and end of the various nectar flows and pollen crops, and of the effect on these of the humidity of the atmosphere ; also of the variation in weight of hives on scales. A record of the days on which bees are able to fly (as made by the **Austrian B.K.A.** observation stations) would also be of interest.

Practical researches.—Results would be reached much more rapidly if several beekeepers combined to test such matters as :—

(1) The effect of " spreading the brood " during the swarming season.

(2) The best place to insert a full sheet of foundation in the brood nest at different times of year and in different circumstances.

(3) The real extent to which a queen excluder is a hindrance to the bees ; and many similar questions.

Each beekeeper would only need to give up two or four stocks to the research, and would not therefore have to risk, if not sacrifice, his entire honey crop. Naturally in order to get a reliable average, it would be necessary to secure the co-operation of a good number of investigators.

Enough has, I think, been said to show that **The Apis Club** might render a great service to beekeeping by encouraging co-operative research and publishing the results. There are doubtless many other directions, not referred to here, where such research would much increase our knowledge.

Yours faithfully,
ANNIE D. BETTS, B.Sc.

Hill House,
Camberley.

QUEENS FROM PALESTINE.

To the Editor of The Bee World.

DEAR SIR,—It may interest you to know that I received early in June two queen bees from Jaffa, Palestine. They were 15 days in the post. One lost all her attendants but one ; the other had most of her attendants alive, though dazed.

They were removed on arrival from their travelling boxes, and each indirectly introduced to a queenless colony by the following method. The queens were placed each on a standard comb of honey and protected by a small " candy case " (with glass top and wooden sides). These frames were each put in above the brood chamber of the colony to be introduced to, but separated from the bees. Next day they were moved on the frames to the brood chambers, when they were duly liberated by the bees and quickly started egg laying.

Their progeny are very pretty little bees, much like Italians in colours, and are splendid honey gatherers.

Yours faithfully,
(Mrs.) H. O. CHALSEL.

Glendaragh Mansion,
Teignmouth.

A QUEEN ATTACKING WORKERS.

To the Editor of The Bee World.

DEAR SIR,—The following occurrence may be of sufficient rarity to be worth recording.

To-day (25.7.20.) a colony which had swarmed two days ago, was suspected of being about to send out a cast. The suspicion arose from hearing the " qua-a-k qua-a-k " and " tui tui " of the imprisoned and hatched virgins respectively. The hive was accordingly opened, the hatched virgin was found and all queen cells were cut out. Three of the latter were so " ripe " that their occupants hatched out in our hands, and we soon had three virgin queens under three separate tumblers,eagerly licking drops of honey supplied to them.

Nos. 1 and 2 were then placed together under one tumbler and after several abortive conflicts, No. 1 killed her adversary, holding the latter by the head with her legs and stinging below the thorax.

Nos. 1 and 3 were then placed together and No. 1 was again victorious in exactly the same manner. Now came the (to me) surprising part. Three bees from the same hive were put with No. 1 queen and seemed immediately disposed to befriend her. But she, now apparently thoroughly roused, set upon one of the poor workers and stung it to death precisely in the same manner as she had previously killed her rivals.

I do not remember ever having seen it stated that a queen would attack a bee.

Yours faithfully,
DELTA S.

[We are gratified by our correspondent's courage in recording his observations when tolerance is a rare virtue amongst a developing craft. The beekeeper who is spending much of his time amongst the bees, with interest in both profit and study, does not fail to notice occasionally the observations of Delta S. As a matter of fact, by strange coincidence, our correspondent's letter arrived with a presentation of a special introducing cage for virgins designed by Mr. A. Fry, of "Glenrosa," Bansole Road, Gillingham, Kent, for the very reason of the likelihood of a virgin to attack the workers, in case she is nervous and frightened, which is not unusual. A fertile queen is far from likely to attack the workers, although a balled fertile queen will be found to have her sting protruding in her self-defence fight. Regarding virgins attacking workers, see THE BEE WORLD, August, 1919, p. 46. This occurrence is not peculiar to any special race of bees.—Ed.]

HOW "ROYAL JELLY" IS MADE?

To the Editor of The Bee World.

DEAR SIR,—How royal jelly is made by the bees ? Has any recent research definitely answered this interesting question ?

Miss Annie D. Betts says in the December BEE WORLD that royal jelly " consists either wholly or inpart of the secretion of gland system I (Schiemenz)."

Mr. Root, on the other hand, says on p. 594 of the A.B.C. & X.Y.Z. of BEE CULTURE that " the milky food before described, which is given to the young larvæ, and which is supposed to be a mixture of pollen and honey partially digested, is very similar, if not identical, in composition with the royal jelly."

Then, what is the fact of the case ? Is royal jelly identical in composition to the " milky food " or is it not ? If both are really identical and consist of a digested honey-pollen mixture, they must be a vomited prepared diet and not a gland secretion.

Yours faithfully,
YASUO HIRATSUKA.

Tara, Gifu-Ken,
Japan.

BEE FARMING.

To the Editor of The Bee World.

SIR,—In your latest number, Mr. Jarman, in an otherwise appreciative letter, takes me to task for applying the term " parasitic " to the beekeeping industry.

I have not the excuse of ignorance of the connotations of the word, in either its scientific or its social applications, and I have far too high a regard for Mr. Jarman—in particular—and for many other of my fellow beemen to think of wounding his or their susceptibilities.

The poverty of the language—or shall I say, rather, of my own vocabulary—forced me to use the word to which exception is taken, in order to express the idea that British beekeeping is, as an industry, dependent upon others, the farmer, orchardist, even the plotholder, for the provision of the raw material necessary for its existence. I wished, further, to convey the meaning that such provision was outside the intention of these good people, that the giving of a **quid pro quo** was, generally, equally outside the intention of the beekeeper.

This stretching of the meaning of the word parasitic may be abusive; it is certainly offensive as appears from my friend's complaint. I withdraw the word with a barb and substitute——. Would the Editor of "**Bee Craft** oblige ?

The mention of the service—pollenisation—rendered by the bees in return for their loot reminds me of a couple I wot of, a charming pair of **pique-assiette** who are just now battening on a war profiteer and his wife. The speech, manners and dress of this latter couple have improved out of recognition already. This happens to be a case of de-pollenisation.

Yours faithfully,
A. F. HARWOOD.

14, Windermere Road,
South Ealing.

NON-PLINTH HIVES.

To the Editor of The Bee World.

SIR,—The October number of THE BEE WORLD, lent to me by the Secretary of the **I.W.B.K.A.**, is very interesting ; more especially the illustration of the " non-plinth " system which appealed to me on account of my having made a number of hives on this system in the summer of 1898. The design was simpler than that shown but sound, as the hives are as good as ever, although they have been out of doors ever since they were made. I thought that my hives were the first of this design, but afterwards came across a similar design in a paper called "**The Bee Master**" and dated May 15th, 1898.

It is strange that several people should have the same idea at about the same time.

My hives were made of yellow pine except legs, which were of red deal. The outside lifts were of 1½" stuff and the roofs were flat, sloping to the back and covered with sheet zinc. Copper nails were used for the hives. Notes scribbled on the roofs in 1899 are still distinctly visible.

Yours faithfully,
J. W. COOPER.

Milton,
Shanklin, I.W.

DIFFERENTIATING RACES OF BEES.

To the Editor of The Bee World.

SIR,—In your last issue Mr. H. M. Stich, quoting from "**L'Ape e la sua Coltivazione,**" states that **Apis Indica** is identical with the German bee. I do not know **A. Indica** in India itself, where I understand there are two varieties, yellow in the plains and black in the hills; but I do know it well in Ceylon, where only the black variety is native, and where **A. Dorsata** and **A. Florea** are also found. It is quite black and about two-thirds the size of the German bee. Its drone cells are exactly the same size as the German worker cells, and, so far as I remember, its worker cells run rather less than six to the inch. My experience was that it is good-tempered and an energetic worker, but rather prone to the production of fertile workers.

A. Florea is about half its size (or rather less), black-brown with very pronounced white stripes. It builds in the open, usually choosing the middle of a dense bush. It is fairly gentle, and I think its poison must be of different composition from that of **A. Mellifica**, as it does not seem to act so quickly on the blood.

A. Dorsata is a handsome yellow bee about the size of a hornet, and is a perfect devil. I understand Mr. Benton handled it with comparative impunity; but my experience was that, even when clustered in a swarm, it is dangerous to approach. It builds a single comb, 5 or 6 feet in diameter, from the branch of a tree, and migrates to follow the flowering of the **nillu** (a species of balsam), deserting its nest completely and frightening away all large mammals, including the elephant.

Yours faithfully,
H. CAMPBELL.

Brewoods Close,
Cookham Dean.

THE DOMESTIC ECONOMY OF THE HIVE.

To the Editor of The Bee World.

SIR,—Perhaps you will allow me the space necessary for a short reply to Mr. Manley's criticism of the above article which appeared in the January number of THE BEE WORLD.

My critic questions the accuracy of Cheshire's statement regarding the consumption of honey for the production of bees. I did not do other than make use of Cheshire's figure. I neither expressed myself as satisfied with its accuracy, nor did I challenge it. I hope at some future date to be able to investigate the question in the columns of THE BEE WORLD, for which purpose I am at present endeavouring to secure the necessary observational data.

Mr. Manley quotes from the progress of stocks in his own apiary. From most incomplete information he makes most unjustifiably definite assertions. The reports which have reached me of the weather conditions in the southern Midlands, all agree that early spring this year was of an exceptionally favourable nature. This being the case, how can Mr. Manley possibly ignore the income in computing the cost in honey of the bees and brood in his colonies on the 30th March? He may **think** it negligible. Let him place a colony on a weighing machine next Christmas and keep it there under observation until the 30th March, 1921, and I shall be greatly surprised if he does not change his mind. Nay, I venture to prognosticate that he will be veritably astounded.

As I have already said, Cheshire's figure may or may not be correct, but I repeat what I said in my article, and contrary to what Mr. Manley thinks, that I do not see how the figure can be arrived at with tolerable approximation. Perhaps Mr. Manley can suggest to me a simple way for which I should be extremely grateful.

The question of pollen I did not consider necessary to mention, as, fortunately for the bee, the Beekeeper does not covet pollen for himself, and the bee is therefore not likely to suffer through its deficiency except on very, very rare occasions. My prime object in discussing The Domestic Economy of the Hive was the amplification of the conditions underlying my theory that I.O.W. disease is engendered by overworking the bee. One authority estimates the consumption of pollen by a strong active stock at anything up to a maximum of 100 lbs. per annum.

Mr. Manley thinks people prone "to accept the sayings of Cheshire and others as uncontravertible." What prompted this remark I am at a loss to discover, as I closed my article with the statement, "I place it before readers of THE BEE WORLD, not as incontrovertible fact, but as a stimulant "......etc.

Now, I will admit that there **are** some doubtful points in the article which I wrote and which Mr. Manley criticises—much more unstable statements than Cheshire's on which the article was built up, but I leave them to your readers, including Mr. Manley, to find out if they feel disposed to take the trouble.

In conclusion, I would suggest that someone use the data quoted from **L'Apicoltore,** see THE BEE WORLD, page 227.

Yours faithfully,
H. M. STICH.

Riccartsbar Avenue,
Paisley, W.

PROGRESSION OR RETROGRESSION?

To the Editor of The Bee World.

SIR,—In a letter titled as above, Mr. F. M. Claridge states that the bulk of American beemen are now forsaking the single-walled Langstroth in favour of a double-walled type. He argues from this a justification of the as-you-were attitude of British official beemen. "Why then should we revert to a style that is already condemned and out-of-date? Is that progress?" he triumphantly asks.

Let me assure him that there is no such movement. The overwhelming majority of beekeepers in the U.S., Canada, West Indies, Australia, S. Africa, New Zealand, Argentine, etc., find the ⅞" Langstroth good enough, I do not say ideal. There is a movement discernible, and in some districts it can correctly be described as phenomenal, but it is a movement in favour of the Jumbo or Modified Dadant, also a single-walled ⅞" hive.

I fully agree that some stores will be saved and some winter mortality avoided by going in for elaborate packed double-walled hives, or for troublesome extra covering to single-walled hives; but I cannot bring myself to believe that in temperate seasons like those of England it is worth the while. The results I obtained in N. Virginia from Langstroth hives placed out on a bare, terraced hillside, where shade temperatures vary from zero to 100°, convinced me of the folly of British beemen in clinging obstinately to their own over-elaborate, yet undersized models. All subsequent observation and experience has only deepened this conviction.

I was greatly amused to read in a contemporary of yours that I.W. disease was due, beyond a shadow of doubt, to the desperate and exhausting efforts of queens in keeping up the necessary egg laying for the British standard brood chamber. I can only exclaim, "Gee whizz! Then what sort of a disease shall we get here, where queens are expected to fill the square Jumbo of 4,400 square inches of comb surface (thirteen 17⅝ × 11¼)?" Can it be that Americans are such greedy megalomaniacs, that in hounding on panting queens to record egg-laying they will induce a paralysis that will paralyse apiculture?

Yours faithfully,
JOHN H. PROTHEROE.

Fitzpatrick, Ala.
U.S.A.

[Commenting on the above letter, Mr. F. M. Claridge, of Copford, writes: If Mr. Prothero will re-read **carefully** my letter in the February number of THE BEE WORLD, he will see that he has badly mis-quoted my words. I must emphatically deny that I stated that the "bulk of American beemen were forsaking the single-walled Langstroth hive in favour of a double-walled type." That such a thing may happen in the future, I consider a possibility, but under existing conditions of supply, the majority of beekeepers are tied down to whatever pattern the manufacturers offer at the most reasonable price. Has Mr. Prothero ever considered to what an extent every consumer is in the hands of the manufacturer, whether he is a beekeeper, or a draper? Those readers of THE BEE WORLD who are also readers of American bee papers, will agree with me that there is a distinct movement in favour of a larger hive: and again referring to the double-walled hive, which I mentioned in my previous letter as being similar in principle to our W.B.C. and Cowan types, I will call their attention to the advertisement of the A. G. Woodman Co., showing their **Protection Hive** in section, which is abundantly clear to prove my words. I do not make the rash statement that all beekeepers in U.S.A. are taking up this type, as the factor of expense in the change over is too big a consideration for most of them, but from the opinions given in several recent articles in American journals, this type should eventually come into its own.

Comparing notes, the gist of Mr. Prothero's remarks is simply confirmative of my own opinions, which I have already given as leaning toward the Jumbo frame. What more can be said?]

LEGISLATION.

To the Editor of The Bee World.

SIR,—Some three or four years ago, I wrote a number of letters on the subject of legislation in connection with bee culture, which appeared in the **British Bee Journal,** my object being to give a lead to British beekeepers by showing what legislation had done for New Zealand beekeeping. But so far from accomplishing my object, it seems to have been time and energy wasted, for with the exception of some private letters of appreciation from a few progressive British beekeepers, nothing eventuated from the effort. It is now some 15 years or more ago since the first attempt was made to bring about legislation in Britain, and about 14 years since a gentleman who took a prominent part in the movement wrote me, that owing to the unreasonable opposition encountered, he had given the whole matter up in disgust. Nine years ago, Mr. Tickner Edward endeavoured through **"The Smallholder," "The Standard,"** and other publications to arouse interest in legislation, pointing out what had been accomplished in other countries through their several Apiaries Acts.

Notwithstanding that another move had been made, judging by the report of the Meeting convened by the Ministry of Agriculture held in London, on February 6th last, to discuss legislation, there appeared to be every indication of a bigger opposition than ever. This opposition is not so much against legislation as against the way in which some few are endeavouring to bring it about.

It is apparent from much of the correspondence of late that many of your leading beekeepers have lost confidence in the **British Beekeepers' Association** and all that it undertakes. This want of confidence can scarcely give cause for surprise, when but a short time ago the Editor of the **British Bee Journal**, on behalf of the **B.B.K.A.** disclaimed all authorship of the proposed Bill drawn up in 1912. This presumably, to shield the Association from any shortcomings the Bill contained. Who in the name of common sense should be better qualified to know what is required, and therefore better able to draft a satisfactory Bill than the **B.B.K.A.** which considers itself the representative institution of British beekeeping? In this disclaimer it seems to me is a confession of weakness on the part of the **B.B.K.A.**; instead of leading, it is content to follow.

I can see no prospect of improvement in British beekeeping until you have judicious legislations to control the industry, and unless such legislation is well-judged, and of a reasonable nature, more harm than good will result. If representatives of all your Associations met and had copies of the principal Apiaries Acts of other countries before them, surely it would not be difficult to draft a Bill that would meet the approval of the great majority of your beekeepers and set your industry on a sure footing to become in time as important as it is in other countries.

Yours faithfully,
I. HOPKINS,

Epsom, Auckland,
N.Z.

BEEKEEPING IN CEYLON.

To the Editor of The Bee World.

DEAR SIR,—The honey bees of this Island are:—

(1) **Apis indica,** the common honey bee of India and the East Indies, the only species of Apis that has been domesticated.

(2) **A. dorsata,** the Giant bee of the East, larger and less tractable than (1) and found only in the wild state.

(3) **A. florea,** smaller and of a milder disposition than (1): not domesticated.

A fourth honey gatherer is **Melipona irridipennis,** called the dammer bee, smaller and milder than (3). It stores honey not in cells but sacs, which are agglutinated, together with food stores, by means of a resinous medium.

Apis florea builds a single delicate comb about 9 × 5 inches, and generally attaches it to the smaller branches of low trees, e.g., the cinnamon. The honey is excellent in quality and flavour. Prof. Benson, of the U.S.A. (who visited Ceylon some years ago) was of opinion that this bee could be induced to construct additional combs parallel to the first, but all local efforts to this end have failed, chiefly owing to the bee being an open-air worker and not appreciating a confined situation.

A. dorsata builds a comb about 3½ by 2½ feet, and suspends it to the larger branches of lofty trees, overhanging rocks, the undersurface of bridges and occasionally to the arches of houses. Benson considered this the most wonderful bee in the world, but his efforts (and those of others) to domesticate it have not proved successful. The bee is extremely vicious in character, and its honey, which has a strong flavour, is practically only used in medicine, like that of **Melipona irridipennis.**

A. indica, as already mentioned, is the only species of Apis that has been domesticated. From time immemorial the Sinhalese people have been known to keep these bees, after their own manner. Among village-folk in the remoter parts of the Island, honey is only obtained through bee hunters who burn out the bees in their natural homes in the forest by means of a torch, and then rob the honey combs. Among townspeople a less drastic method is employed. The bees are attracted into a clay pot (previously fumigated by resin smoke and its mouth smeared with honey) which is set up on a tree during the swarming season (March-April). When the honey season comes round (July-August) the bees are smoked out and the honey taken. If the pot has to be broken another one is kept in the same place as the first and generally attracts the bees again.

Within the past 50 years various attempts have been made by those interested in beekeeping to improve upon the crude method in vogue, and a couple of years ago an association was formed with a view to more closely studying the Ceylon honey bee and decide upon a standard hive of suitable dimensions, so that local beekeepers may adopt the same description of hive instead of each, as hitherto, using one of his own designing.

Prof. Benson suggested for **A. indica** a frame 8 inches deep by 13 inches long (outside measurement), the bars to be ⅞ inch wide, and the space between end of frames and sides of hive ¼ inch, making the hive from front to rear 13½ inches (outside measurement), the width of hive (to accommodate 8 frames) being 9¼ inches (inside measurement) allowing 1⅛ inches to each frame and ¼ inch for extra space on sides.

Mr. Charles Andree, who has considerable experience of beekeeping in Ceylon, has used a frame 12 by 7 inches (inside measurement); Mr. A. B. Goonetilleke, another enthusiastic beekeeper who favours a small hive, has adopted a frame 8¾ by 3¾ inches; while Mr. Claude Crozier, who is carrying on a series of trials with hives of different sizes, is an advocate of the big hive, approximately to the British Standard.

A committee appointed by this association recommends a frame 11 by 5 inches, as approved by Mr. H. S. Stevens and Mr. Rolf Smerdon, two of its prominent members. Among the arguments adduced in favour of a frame of this size are that under natural conditions **A. indica** constructs combs about 6 inches deep, the lower 4 to 5 inches being used for brood; the brood or nest is usually oval in shape, 8 to 9 inches long, and as already stated, 4 to 5 inches deep, with honey stores disposed around it; the space provided by a frame 11 by 5 inches should thus allow of a nest of the natural size with room for stores of food, the super being used for surplus stores.

It is estimated that a hive of ten frames, each 11 by 5 inches, will provide for about 40,000 cells, since a square inch of **Apis indica** comb contains 36 cells; further that a stock of these bees number 28,000 to 30,000, so that there will be a balance of about 10,000 cells for food storage, which is considered ample.

At present a large number of hives constructed on this basis are being used with a view to give the provisional standard frame a good trial, the majority being kept at village schools to which this association is giving special attention, as being convenient centres for the introduction of improved beekeeping as a village industry.

I should add that for the present the Association is confining its energies to the improvement of our local honey bee. Some of its members have been making trials with imported bees (Italians, etc.) but with poor results.

I need not say that I shall be greatly obliged for any advice you may have to give or suggestions to offer.

Yours faithfully,
C. DRIEBERG, B.A., F.H.A.S.
Secretary, Ceylon Beekeepers' Association.

P.S. I was greatly interested in the note on classification of bees translated by Mr. Stich from Dr. Asprea's book in your Spring Number though I am not very clear what is meant by the German bee, which is said to be identical with **Apis indica,** and again with the Black bee (**A. mellifica**). I always understood that **A. indica** was exclusively an Asiatic species and unknown in Europe. —C. D.

LARGE BROOD FRAMES.

To the Editor of The Bee World.

DEAR SIR,—In a letter to THE BEE WORLD of September 1919, I mentioned that one of my colonies was being closed down on ten Quinby size frames, with a similar number of stored Standard size combs above.

This colony wintered perfectly, and had drones hatched out on April 19th—a very early date for Scotland. Several seasons' experience with these 18″ × 12″ frames had satisfied me that **a good queen could easily fill ten of them solid with brood,** but the bees generally got ahead of her during the honey flow and stored heavily under the top bars. This run of sealed honey over the brood was detrimental to the clover honey supers and absolutely fatal to all hopes of surplus from the heather, but **altered methods have given some success** during 1920.

Sometime in May I confined the queen below by excluder and in early June removed the upper storey of Standard frames, getting enough capped brood to make a couple of nuclei. The large frame brood chamber was then divided in two portions on the old stand, a fertile queen inserted in the queenless part and both lots allowed to work through an excluder in the same set of section supers.

By mid-August the nucleus lots had built up to ten frames of brood apiece, while the large hive had ten frames full of brood, was overflowing with bees and had plenty drawn combs but little honey in the sections. I then united the two lesser colonies with one queen on a single set of combs, which left ten frames of beeless brood to put on the stand of the large frame colony after moving the latter aside. The best queen and the section supers were then transferred to this new brood centre, which was afterwards strengthened by bees shaken from off the large frames. **The hive is easily my best, fully occupying and storing in eighty sections while its subsidiary colony is in two supers.**

The shifted large frame portion has been requeened, and is storing in an upper chamber for its own future needs, so apart from surplus I have now three good colonies from one spring stock. I am again wintering over in two storeys and intend to work the large frame colony on similar lines next season, **using two queens to prevent brood nest storage during the clover honey flow, and changing over to a shallower brood chamber for securing the heather crop.** For use with the Quinby hive I made special double size section supers holding 40 sections in one tier and on changing over was agreeably surprised to find a ten-standard frame colony crowding two such supers and even storing in the outer rows of the top one.

If bees can be got to work like this at the very end of August there seems no valid reason why we should cramp strong colonies and put a premium on swarming by usuing small-size racks during the main honey flow in June or July.

Yours faithfully,
Gretna, Carlisle. J. M. ELLIS.

THE "SPRING NUMBER."

To the Editor of The Bee World.

DEAR SIR,—Allow me to heartily congratulate you on the delightful feast of good things you have provided in your "Spring Number" for your readers. You remark that a decision will be made on May 29th whether THE BEE WORLD will be continued or not; at least, that is how I read them on bottom of page 192. I can only say that for the benefit of the bee craft generally, and British beekeeping specially, I sincerely hope the decision will be favourable for continuance.

I would like to remark that some allowance must be made by your readers for the difference in time between my writing on current topics for your journal, and the time they appear in THE BEE WORLD. For instance, my latest number at the time of writing this was, I presume, issued early in May; I received it on July 9th. Our English mail leaves on or about the 17th; at the earliest, you would receive this communication about August 20th, supposing I wrote by outgoing mail. If published in your next issues after receipt, September, there would be an interval of four months, during which time things may have altered so much as to make my observations and comments appear rather belated.

There are so many good things in the last BEE WORLD that one can scarcely speak more favourably of one item than of another. The result of the Conference re Legislation, has the most important bearing in regard to the future of beekeeping in England, and I shall be particularly interested in the future movements of the Authorities. I am enclosing an advanced slip of our Apiaries Act (1908), with the Amendments and Additions (1913) inserted, which you may think worth publishing to compare with your suggested Act—the copy I am enclosing is our Act up-to-date.

I consider the clause re registration of all beekeepers or apiaries suggested in your Act to be of the highest importance. I suggested in my Annual Report for 1908-9 such a clause, which was embodied in our Act in 1913. The weakest part of our Act is the maximum penalty (£5) which a former Minister of Agriculture was responsible for; we are now trying to get it raised to £20, and the minimum penalty to £2, for any infringement of the Act.

Yours faithfully,
Epsom, Auckland, I. HOPKINS.
New Zealand.

[Following is the copy of the N.Z. Apiaries Act with amendments, which Mr. Hopkins has kindly forwarded to us. Its publication at the present juncture will be of much interest to British beekeepers in general whether in favour of or against Legislation :—

APIARIES ACT, 1908.

With amendments (1913) inserted in regular order.

An Act to consolidate certain Enactments of the General Assembly relating to the Bee Industry in New Zealand.

Be it enacted by the General Assembly of New Zealand in Parliament assembled, and by the authority of the same, as follows :—

1. (1.) The Short Title of this Act is the Apiaries Act, 1908.

(2.) This Act is a consolidation of the enactments mentioned in the Schedule hereto, and with respect to those enactments the following provisions shall apply :—

(a.) All Orders in Council, appointments, notices, directions, and generally all acts of authority which originated under the said enactments, and are subsisting or in force on the coming into operation of this Act, shall enure for the purposes of this Act as fully and effectually as if they had originated under the corresponding provisions of this Act, and accordingly shall, where necessary, be deemed to have so originated.

(b.) All matters and proceedings commenced under the said enactments, and pending or in progress on the coming into operation of this Act, may be continued, completed, and enforced under this Act.

2. In this Act, if not inconsistent with the context,—

"Apiary" means any place where bees are kept.

"Beekeeper" means any person who keeps bees or allows the same to be kept upon any land occupied by him, or who has in his possession or allows to be kept on any land occupied by him any appliances that have been used in connection with apiculture.

"Disease" means foul-brood (Bacillus pluton and Bacillus larvae), bee-moths (Galleria mellonella and Achraea grizzella), Isle of Wight disease (Nosema apis) and any other diseases or pests from time to time declared by the Governor in Council to be diseases within the meaning of this Act.

"Frame hive" means a hive containing movable frames in which the combs are built, and which may be readily removed from the hive for examination.

"Inspector" means any person appointed by the Governor as an Inspector under this Act.

3. Every beekeeper in whose apiary any disease appears shall, within seven days after first becoming aware of its presence, send written notice thereof to any inspector appointed under this Act.

4. The Governor may from time to time appoint inspectors and other officers to carry out the provision of this Act.

5. Any inspector may enter upon any premises or buildings for the purpose of examining any bees, hives, or bee appliances, and if the same are found to be infected with disease he shall direct the beekeeper to take within a specified time such measures as may be necessary to cure the disease; or, if in the opinion of the inspector, the disease is too fully developed to be cured, he may direct the beekeeper to destroy by fire within a specified time the bees, hives, and appliances so affected, or such portions thereof as the inspector deems necessary. The powers of entry conferred on an inspector by the said section five may be exercised by any person authorised in writing in that behalf by the inspector, and any person so authorised shall forthwith report to the inspector the results of the examination made by him.

6. In any case in which it is found by an Inspector that the bee-combs in any hive cannot, without cutting, be separately and readily removed from the hive for examination, he may direct the beekeeper to transfer the bees to an approved frame hive within a specified time.

7. (1.) Every direction by an inspector shall be in writing under his hand, and shall be either delivered to the beekeeper personally or sent to him by registered letter addressed to him at his last known place of abode.

(2.) Every such direction shall be faithfully complied with by the beekeeper to whom it is addressed, and, in default of compliance within the time specified, the Inspector or any person authorised by him in writing in that behalf may within one month destroy or cause to be destroyed by fire, at the expense of the beekeeper, any hives other than properly constructed frame hives, or any bees, hives, and appliances found to be infected with disease.

8. No beekeeper shall—

(a.) Keep or allow to be kept upon any land occupied by him any bees, bee-combs, hives, or appliances known by him to be infected by disease, without immediately taking the proper steps to cure the disease ; or

(b.) Sell, barter, or give away any bees or appliances from an apiary known by him to be infected by disease.

9. No beekeeper shall keep or knowingly allow to be kept on any land occupied by him any bees except in a properly constructed frame hive.

10. Every person is liable to a fine not exceeding five pounds who—

(a.) Obstructs an inspector or any person acting under the written authority of an inspector in the exercise of his duties under this Act, or refuses to destroy or to permit the destruction of infected bees and appliances ;

(b.) Fails to comply with any direction given under the provision of this Act by any inspector ;

(c.) Commits any other breach of this Act.

11. No person shall be entitled to compensation for anything lawfully done under this Act.

12. The Governor may from time to time, by Order-in-Council gazetted, declare any disease or pest affecting bees or apiaries (other than those mentioned in section two hereof) to be a disease within the meaning of this Act.

(1). The Governor may from time to time, by Order-in-Council gazetted, prohibit absolutely, or except in accordance with regulations under this Act,—

(a.) The introduction into New Zealand, either generally or from any specified place, of any bees, honey, comb-foundation, appliances, or other thing which is diseased or infected with disease, or which in his opinion is likely to introduce any disease into New Zealand ; or

(b.) The removal from any specified portion of New Zealand to any other portion or specified portion of New Zealand of any bees, honey, comb-foundation, appliances, or other thing which is diseased or infected with disease or which in his opinion is likely to spread any disease.

(2.) For the purposes of this section the Governor may, by Order-in-Council gazetted, appoint any specified ports to be the only ports of entry for bees, honey, comb-foundation, or appliances, or for any specified bees, honey, comb-foundation, or appliances.

(1.) The Governor may from time to time, by Order-in Council gazetted, make regulations—

(a.) Prescribing the manner in which diseased bees, honey, comb-foundation, appliances, and infected packages shall be treated, cleaned, destroyed, or otherwise disposed of ;

(b.) Prescribing the manner in which any bees, honey, comb-foundation, appliances, or other things introduced into New Zealand in contravention of this Act or of any regulations thereunder, shall be treated, cleansed, destroyed, or otherwise disposed of ;

(c.) Providing for the free registration of apiaries, and the terms and conditions of such registration ;

(d.) For the inspection, grading, packing, marking, stamping, branding, and labelling of honey ;

(e.) Prohibiting the exportation of honey from New Zealand otherwise than in accordance with such conditions as may be prescribed ; and

(f.) Generally for any other purpose for which regulations are contemplated by the principal Act or this Act, or which are deemed necessary or expedient in order to give full effect thereto.

(2.) All regulations under this section shall within fourteen days after their publication in the " Gazette " be laid before Parliament if sitting, or, if not, then within fourteen days after the commencement of the next ensuing session].

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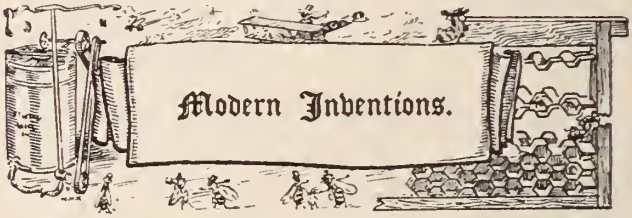

Modern Inventions.

A New Power Extractor. †

By WM. A. WEIR, TORONTO.

Great interest is evidenced in any new suggestion on mechanical devices connected with power extractors. At a meeting of the Brant County Association in Brantford on May 29th, a most convincing test was given the **New Markle Extractor.** This machine is an improvement on the machine which was exhibited at the Ontario Beekeepers' Convention in 1917, and for a comparison I have gathered the full details for publication. I might mention, however, that patents are pending on the new machine.

All power extractors are designed to utilize the principle of centrifugal force, but the arrangement of the wire baskets in this new extractor is a distinct departure. Instead of revolving inside the extractor can, with side of the basket practically parallel to the can, the side describes an acute angle with inside of the can.

The inventor, Mr. G. W. Markle, of Brantford, has always maintained that centrifugal force for the extraction of honey was not used in the best possible way to get the best results in the well-known types of power extractors. He claims that the new angle of the basket to the extractor can joins the power of centrifugal force and inertia of the honey, which at this new angle is not losing force by dragging against the back of the cell.

In addition, he says with the baskets at this new angle, the honey is now extracting into a pocket of vacuum instead of against a high air pressure. The claim seems reasonable. There is no question about the strong current of air which is developed by the rapidly revolving baskets within the stationary can. In running the baskets at an angle, the pressure should cease to do harm, as its pressure is only as wide as the outer corners of the basket. Therefore, from the outer corner of the basket and along the face of each comb there is no pressure and a vacuum is formed. The new angle of the comb also places it in the best position, says the inventor, to part company with the honey. In the new position the cells are turned slightly backward. The comb, when being extracted, speeds rapidly forward while the weight of the honey pulls backwards.

Second only to the efficiency in extracting is the demonstrated advantage the new model has of yielding up unbroken combs at the end of the whirl. The baskets are centrally pivotted instead of hinged at one side and even, though the baskets are automatically reversed at high speed, the combs do not break. We have always had to caution the operator of the power machines to use care when reversing as " slamming " the baskets when reversing did serious damage to new combs especially.

The new extractor appeals strongly to the sense of cleanliness and convenience. We never did like the maze of steel work, cogs, bands and such like at the top of the extractor. True, the baskets can be removed and pulled to pieces but the cleansing of the can and the remaining iron parts was an awkward job at best. The new model has all the machinery at the bottom outside of the can. The can simply sits on top of the machinery to catch the honey and can be turned around without disturbing the machine. The baskets slip off and can be cleaned as easily as the old type. In this connection it is well to add, that there is no chance of the honey coming in contact with the machinery.

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† The Canadian Horticulturist and Beekeeper, July, 1920.

running at full speed. The writer has been informed that for days previous to this meeting the extractor had been run to detect any weakness in the new model.

The cost of this new machine is, of course, very much higher than the old style machine, and it is yet to be seen how the costs of operating depreciation, etc., affect the investment, but already some of our most prominent beekeepers have declared their confidence in the investment, by ordering a machine or machines for the work of extracting this year's crop.

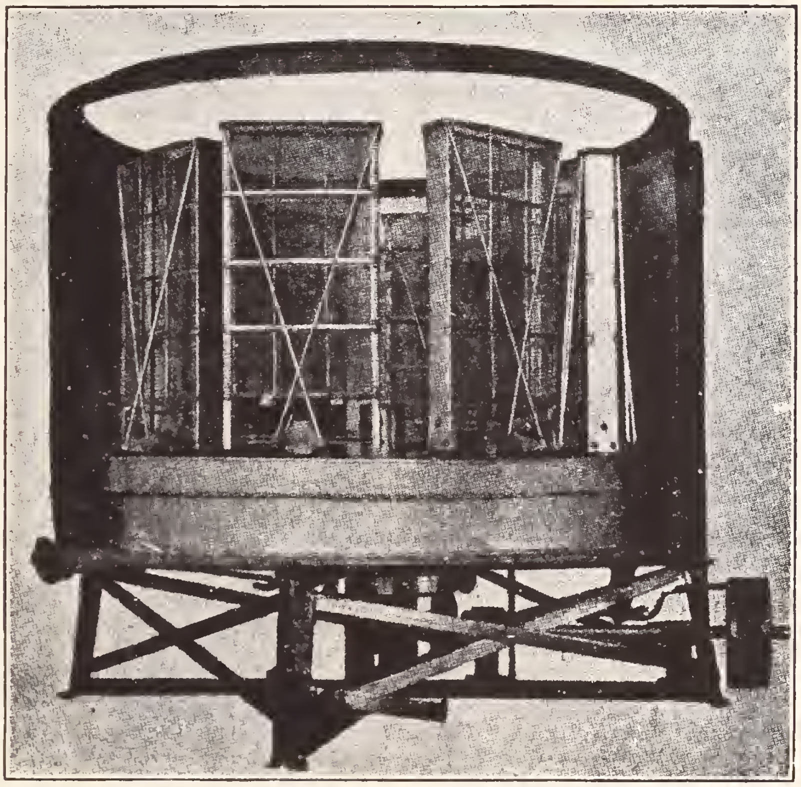

Fig. 5.

Side View, **Markle Power Extractor**—Can of extractor cut away to expose view of baskets and revolving table. Note all mechanism outside of the can. The pump is to the extreme right of the reader.

The machine is very conveniently mounted on a steel stand and the honey pump is directly connected with the main drive shaft, so that the honey pump belt is eliminated.

The ease of operation and the time saved is also much in favour of the new model. Owing to the weight of the reel with baskets bearing directly on friction pulley, the use of heavy thrust springs, etc., is eliminated and a minimum of power is used. The proper thrust on the transmission pulley is automatic and fool proof. Reversing of the combs is done at full speed as many times as the operator wishes, by foot or hand tripping a small lever, and the time required for extracting a set of combs is less than with the old type. There is also nothing at the top of the can to impede rapid handling of the combs in and out of the baskets.

The most difficult question of all—durability—was seriously discussed at the 1918 convention of the Ontario Beekeepers' Association, especially with regard to the centrally pivotted baskets. Mr. Markle has apparently accomplished his object of securing great strength without adding excess weight to the machine and baskets The baskets have side braces of steel rods, one fastened at each top corner of basket and extending down to the lower opposite corner of the frame. They, therefore, cross at the centre of the basket.

At the meeting already mentioned of the Brant County Beekeepers' Association on May 29th, a 10 pound weight was put at the top of each basket and the baskets reversed while the machine was

History is philosophy teaching by examples.—Bolingbroke.

HISTORY OF THE IRISH BEEKEEPERS' ASSOCIATION.—IV.

By M. H. READ, M.A.

By this time, beekeeping had increased to such an extent that in a season of good yield the honey market was glutted. So far was this the case in 1900, that good sections were saleable in Dublin with difficulty at 4d. each.

This appeared to call for organization on a commercial basis, such as co-operative society. But as this could not be organised immediately throughout the whole country, certain of those prominent in the Association, at the suggestion of Mr. Digges, formed a small company—The Irish Honey Company—to handle the bulk of the crop.

Mr. Digges undertook a journey to London, arrived with samples of sections and extracted honey bearing the Company's label, and, within a few days, secured orders for several tons, at prices which enabled the Company to pay fifty per cent more than was obtainable in Dublin.

The writer took oversight of the store in Dublin while a manager was being initiated.

The aid of the I.A.O.S. was invoked, and active measures were taken to organise Co-operative Societies of Beekeepers all over Ireland, Mr Banfield, of Bandon, being the Organizer.

He first came to the notice of the writer as a deeply interested spectator in the Bee Tent at Clonakilty Show; and, having been induced to assist inside the netting at a crowded gathering in a later Show in the same County, his enthusiasm was kindled to such a pitch that, when an active organizer was required for Co-operative Societies, the choice fell on him, and was abundantly justified: though his course was meteoric; as, with few exceptions, these Co-operative Societies failed to turn over sufficient to pay working expenses out of the margin of profit.

The central organization was named The Irish Beekeepers' Federation Limited, whose capital was provided by a guaranteed Bank overdraft, in addition to its paid up share capital.

This took over the business of the Irish Honey Co., and dealt in appliances as well as honey and wax.

A few years' experience convinced the Committee that the honey business was not large enough to pay running expenses unless combined with some other business; and it was handed over through Irish Producers Limited to the I. A. Wholesale Society.

Though this is not properly history of the Irish Beekeepers' Association, it had considerable bearing on it; as, previous to its formation, the trade in appliances had for years been represented by two firms on the Committee.

These representatives found fault with the promotion of a co-operative trading body by officers of the Association; and this militated against the harmony of Committee Meetings to such an extent that the members were called upon to decide between the parties; and the nominees of the Co-operation were returned on the Committee for 1901-2.

This dispute had a bad effect on the relations between D.A.T.I. and I.B.A. for several years; though the writer as Hon. Secretary of the Association was treated with considerable confidence by the Department, and conducted some of its earlier examinations in the case of candidates for the post of Instructor in Beekeeping to County Councils.

As before indicated, the supplanting of the skep system by modern methods was accompanied by an increased manifestation of foul brood; and the hope of legislative powers to deal with it was long deferred.

The Rev. Mr. Digges used his exceptional position as Editor of the **Irish Bee Journal** (which in 1902 was vested in him by the Committee) and member for Connaught of the Council of Agriculture, to bring legislation to fruition, and carried a resolution of the Council in favour of legislation; and the Vice President, Mr. Thos. Russell, gave effect to the resolution by getting the Bee Pest Ireland Bill made an Act of Parliament in 1908. No new machinery was required for carrying out this Act. The responsibility fell on the County Councils as the local authority, whose agents were the Instructors in Beekeeping.

A weakness in the beekeeping scheme of the Department has been that, from motives of economy, Instruction in Beekeeping has as a rule been combined with Horticulture, and county councils appointed a good horticulturist in preference to a good beekeeper.

The Department has endeavoured to remedy this defect by providing courses in beekeeping at the Albert College (formerly the Model Farm) Instructive Apiary; where men holding the appointment of Instructor in Horticulture were encouraged to improve their knowledge of beekeeping; and often with excellent results. Also since the Department took over the Agricultural Staff of the Congested Districts Board, including Mr. T. B. O'Bryen. Mr. O'Bryen is occupied during the season in visiting the various Counties, inspecting the beekeeping work of the Instructors, and imparting a portion of his spirit to them.

In 1908, when the Bee Pest Act was passed, the menace of I.O.W. disease was appreciated by so few, that the scope of the Act was confined to foul brood, notwithstanding the efforts of Mr. Digges to have it apply to all contagious bee diseases.

When the B.B.K.A. were arranging for an Insurance Policy, I.B.A. sought to have the arrangement extended to Ireland. However the B.B.K.A. preferred to confine the policy to their own members. The need for such a provision for Ireland was accentuated by the mulcting in damages of a Mrs. Daly, of Scartaglen, for violence done to a neighbour's donkey by her bees.

The matter was taken up by Mr. Digges, who arranged for a policy available on easy terms to all subscribers to the **I. B. Journal.**

The popularity of demonstrations in the Bee Tent at the various Agricultural Shows increased so much that the Department provided a second Bee Tent and gave an annual grant to the Association in aid of the demonstrations. In 1908, demonstrations were given at 29 Shows.

The great increase of local associations called for a further departure in providing outlets for honey. With the prospects of working on definite lines in 1912-13, it was perceived that the question of grading should be settled. A sub-committee was appointed, of which Mr. Tweedy undertook the Hon. Secretaryship, for dealing with marketing and control.

This Committee held many meetings in consultation with the Marketing Branch of D.A.T.I., and representatives of the trade, and formulated a set of rules for distinguishing sections into four grades. Control was attained by labels bearing consecutive numbers so that in case of complaint, the label affixed to a section could be traced back to the person to whom it was issued.

Run or extracted honey must have a specific gravity of 1·4, in order to come within grading conditions. A prominent display of graded honey was made at the R.D.S. Winter Show of 1913.

Among other matters which occupied considerable attention in their time, may be mentioned the beekeeping exhibit at the Cork International Exhibition, financed by D.A.T.I., the most notable feature of which was the monster skep, in which the various objects of interest were shown.

The "I.B.A. 1909 Hive" was evolved as an improvement on the "C.D.B." providing more space beneath the frames, a larger ventilator and space for 14 frames, thus giving greater control over swarming.

In 1910-11 application was made for a substantial grant from the Development Fund. The application had the support of the Department, but was refused.

Just before the outbreak of the Great War, the Association's Expert's Certificate was in considerable request in Great Britain. Mr. Anderson, of Stornoway, set the ball rolling by coming over to be examined, and in June 1914, two members of the Examining Board visited Kent to examine twelve candidates.

It has been difficult to re-establish normal conditions with the return of peace, owing to the severe depletion of apiaries through attacks of I.O.W. disease and the shortage of sugar. And while this shortage lasts, much progress cannot to be expected.

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'Tis better that a man's own works than that another man's words should praise him.—Sir R. L'Estrange.

TAYLOR'S QUEEN INTRODUCING STAGES.

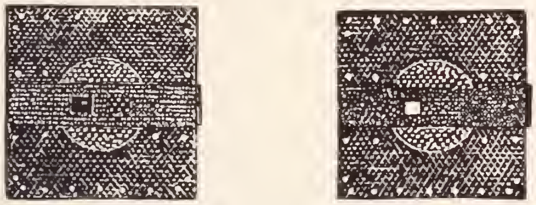
"Judgment is forced upon us by experience," said Johnson. This is distinctly manifested in relation to the subject of queen introduction upon which so many different views are held, depending often on the experience of beekeepers. The subject, however, is clearly fit only for the authoritative judgment of those who introduce queens at least by the dozen, if not by the hundred, in a season.

The methods of queen introduction are classified into **direct** and **indirect**. Non-commercial beekeepers are strongly advised **not** to practise the former, except with emerging brood. The statistics relative to beekeeping practices are notoriously untrustworthy and many a beekeeper is reluctant to admit and publish his failures, with the result that successes are often exaggerated, and we confidently assert from long study that there is no ordinary method of queen introduction which is infallible, although the percentage of losses in careful and experienced hands are insignificant. We have practised queen introduction on a large scale by almost every method described and otherwise, only to find more confirmation of our opinion that success did not depend so much on the method as on studying the temperament and the inclinations of the particular colony under treatment. The beekeeper who does not know the characteristics of his bees will rarely if ever succeed in direct queen introduction.

Indirect queen introduction, on the other hand, is within the ability of any intelligent amateur beekeeper, provided the necessary preliminary preparations † are followed. The dome-shaped wire queen cage is in our experience the best for this purpose, inasmuch as the queen could be caged at once, and for as long as a week, on stores of honey and pollen in an old comb (both foods being essential for the building up of her constitution, in case she is not properly fed by the bees, through the cage). As we remarked before, the best advice that can be given to a novice is **not to be too anxious to gain both time and queen,** and although the method above mentioned does not save valuable time, it saves as a rule a valuable queen, which means much to the average beekeeper.

Once the fact that queen introduction, direct or indirect, is not a mechanical procedure is well appreciated by the beekeeper, he is on safe grounds and will manage by experience to master any method and to apply different methods to different cases.

Mr. E. H. Taylor, as possessor of a large breeding apiary in this Country, strongly recommends the use of his introducing stages. He writes: "By the use of these stages, queens may be introduced to stock with almost absolute certainty of success. The old queen is removed from stock and the stage placed over feed hole in the quilt. The bottom of the box containing foreign queen is taken off, and box, bees, and queen put over the stage. Affairs are left thus for two days, and at night the slide is pressed in, and the queen released without disturbing the bees at all. In my own apiary it has had an extended trial and out of thirty-nine queens introduced at one time, thirty-eight were well received. After liberating the queen do not examine the hives for three or four days—there is no need to do it, and it often leads to bad results."



Shut. Open.

Fig. 6.—Taylor's Introducing Stages.

The price of the appliance is very moderate and there is no reason why it should not be in popular use amongst those who prefer indirect queen introduction.

THE "WHYTE" QUEEN INTRODUCING AND NUCLEUS CAGE.

We have already referred ‡ to this **valuable** appliance and to some of its advantages. Mr. Richard Whyte, inventor of the **"Whyte Queen Excluder"** is to be congratulated on the rapid popularity which his cage has attained and on the interest shown in its utility, to judge by the comments which reach us from many readers who greatly appreciate the perusal this section of THE BEE WORLD. It has brought to their notice various useful appliances that are either new or traditionally excluded from the bee manuals, in spite of their importance.

The following illustration clearly shows the **construction** of the cage, which is made throughout of metal, with the exception of the cover which provides a bee-passage underneath.

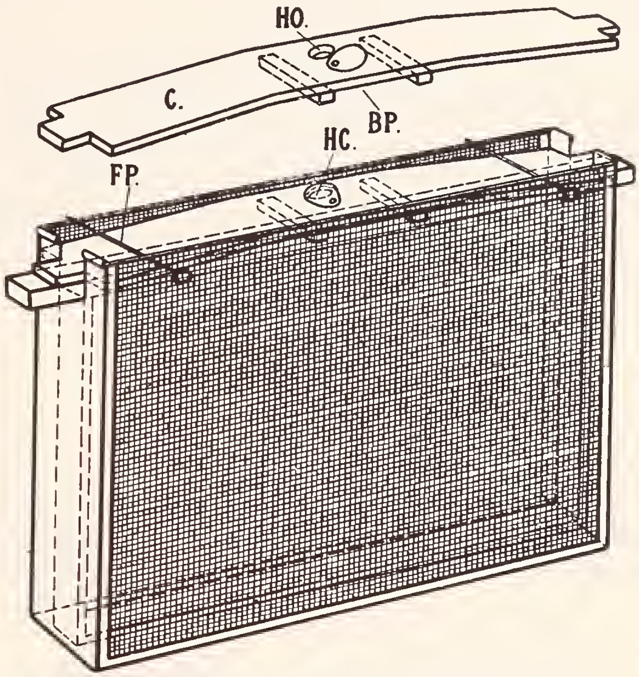


Fig. 7.—The "Whyte" Queen Introducing and Nucleus Cage.
C. = Wooden Cover. HO. = Hole (for queen introduction) open.
HC. = Hole closed BP. = Bee Passage. FP.—Fixing Pins.

The cage is made in more than one size to take the British Standard Frame (14″ × 8½″), Deep Standard Frame (14″ × 12″), and Simmins' (16″ × 10″). It can be accommodated **within** any brood chamber of its respective size, provides a bee space in front and behind, between its walls and those of the hive, and in the height of the season could safely be accommodated at the extreme side, occupying the place of approximately two frames. Where more than one cage is needed for use, a stock box over the ordinary brood chamber, on which a full sheet of perforated zinc or quilt is placed, will comfortably take five cages, each accommodating a frame of rapidly hatching brood and queen, when in the course of ten days they could be removed and each made the start of a respectable nucleus in an independent hive by the supply of a frame of emerging brood.

In operating the cage, it is most desirable to select only a frame of **capped** brood, and preferably one with bees **rapidly hatching,** so that, on the one hand, the queen will not lack attendants and will start laying early; and, on the other hand, no larvæ will be sacrificed through starvation or insufficient attendance. As the cage takes the room of approximately two frames, it provides ample room within it for the movement of bees and for the insertion and removal of the frame without causing any injury to the brood or bees. The introduction of the queen, however, should be deferred till **after fully** equipping the cage. The hole with the revolving metal shutter in the wooden cover does the trick.

In case the cage is used for more than queen introduction, that is for raising a nucleus, care should be taken in transferring to avoid the flight of the queen, since even a fertile queen is nervous when heading a weak nucleus. To avoid this, the cage, before opening, may be lightly sprayed with warm water if the operation is performed on a hot day, otherwise it should be done towards the evening and spraying avoided. It is not always the case that a nervous flying queen will return. Simultaneously with transference, a comb of rapidly-hatching brood and two of food should be added and thus the nucleus is started.

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† THE BEE WORLD, Vol. I, p. 42.

The cage has other services such as the temporary housing of a queen on a frame of emerging brood when developing an artificial swarm or when uniting a weak nucleus to a medium queenless colony.

Its utility cannot fail therefore to find a place for it in the modern apiary, big or small.

TAYLOR'S COMB RAKE.

In describing the minor tools and appliances used at the famous Glassel Apiary, where money, interest, and knowledge have left nothing to be desired in establishing a model bee farm, Mr. D. M. Macdonald referred to the comb rake in use as follows * : " A small **rake,** called a ' queen persuader,' is periodically run over the surface of sealed comb every time the hives are being examined in spring and early summer. In this way the bees are given the smell and taste of exposed honey. The bees, transferring this to the neighbourhood of the brood, feed the queen, and thus induce her not only to start laying, but to keep it up even when nothing is coming in from the fields."

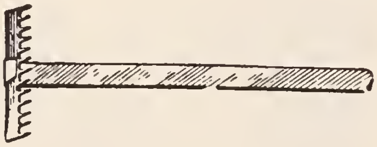

Fig. 8.—Taylor's Comb Rake.

A small tool serving this purpose is listed in Mr. Taylor's catalogue as illustrated above. Whilst the commercial beekeeper would use, if at all, any suitable handy tool, there is no doubt that perfect organisation would demand keeping every tool to its place and function.

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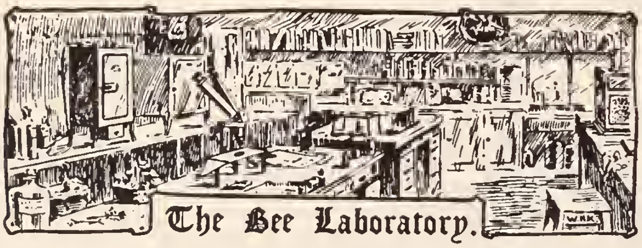
The Bee Laboratory.

Science is nothing but trained and organised common sense.—HUXLEY.

THE BEE'S EGG AND PARTHENOGENESIS.

During the last fifteen years a good deal of work has been done by various biologists on the cell-divisions in the honey bee, particularly on the development of the germ cells and the process of fertilisation. Much of this work was however published in German ; and, as far as the writer knows, no summary of it has yet appeared in the British Beekeeping Press. This is regrettable ; for, though the work itself is highly technical, the general results are simple and of great interest. The following is an abridged account of the conclusions set forth in a paper by Nachtsheim (**Archiv fur Zellforschung,** 1913).

My readers are doubtless familiar with the elements of cytology, the science treating of cell-division. They will remember that every living cell consists of a jelly-like mass, in which is embedded a **nucleus.** This nucleus is composed partly of a substance known as **chromatin** (on account of its capacity for retaining stains). When the cell divides, the process begins in the nucleus ; and the chromatin, after some changes we need not enter into here, breaks up into fragments called **chromosomes.** These split, and one-half of each chromosome goes to each of the two **daughter-nuclei** that are formed as a result of the division. The number of chromosomes is constant for each species of animal or plant.

Since most living beings result from the union of two germ cells, one being derived from each parent, it is plain that, if the nuclei of the offspring are to contain the same amount of chromatin—the same number of chromosomes—as those of the parents, the nuclei of the germ cells must each contain one-half of the usual number. This we find is the case ; during the process of formation of the germ cells, these part with one-half of their chromosomes. The last two cell-divisions resulting in the formation of the germ cells are known as the " polar divisions." In one of these the reduction is effected ; so that the conjugating germ cells have each half the normal number of chromosomes, and in the fertilised egg-cell the normal number is again restored.

Now let us consider the case of the bee. The " first polar division " of the egg (the female germ cell) is in progress when the egg is being laid. The dividing nucleus lies near the head end of the egg, on the convex side (Fig. 9). The whole amount of chromatin (as in the queen's own body-cells) is still present in this nucleus, as also in the two daughter-nuclei into which it divides. Of these, one travels a short way into the egg, and they then both divide again (the " second polar division.") This division is a " reduction division " ; the innermost of the four nuclei formed by it is the female pronucleus or germ-cell proper ; the other three, after some processes which need not detain us, degenerate and disappear. This stage is reached in three or four hours after the egg is laid.

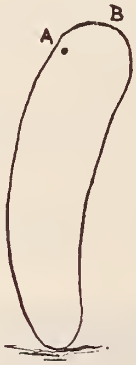

Fig. 9.

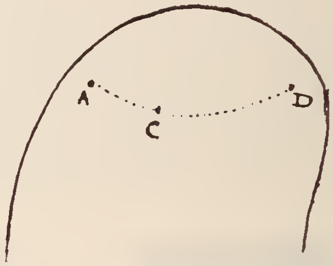

Fig. 10.

Up to this point worker and drone eggs behave alike. They are distinguished, however, by the presence near the micropyle (B, Fig. 9) in all worker or queen eggs of from three to seven spermatozoa (rarely more or less), while these are never found in drone eggs. The spermatozoa lose their tails soon after the egg is laid, and become converted into nuclei each surrounded by a radiating mass of protoplasm—the male pronuclei. They appear to repel one another, so that the one that is by chance nearest to the female pronucleus unites with it, while the others degenerate and vanish. Fertilisation takes place at about C, Fig. 10; and the first cleavage division—the beginning of the young organism—takes place here also.

In an unferilised egg, on the other hand, the female pronucleus continues its journey across the egg to D, Fig. 10; and it is only when it reaches the concave side of the egg (in Nachtsheim's words: " one might say—after this vain search for a male pronucleus ") that the first cleavage division begins.

The normal number of chromosomes in the bee is thirty-two, according to Nachtsheim ; but they group themselves together in twos and fours in such a manner as to make the relationship of the various cell-generations very confusing. This is why all mention of the actual numbers present at each stage has been omitted here. This much is however absolutely certain ; **the nuclei of the body-cells of the developing drone-larva contain only half as much chromatin as those of a worker or queen.** This is proved by their smaller size, added to other considerations, such as the presence of thirty-two chromosomes in the cleavage nucleus of a worker egg, sixteen in a drone egg.

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* The **British Bee Journal,** Vol. XLVI, 1918, p. 394.

We can now understand the fact (demonstrated by Meves and by Doncaster) that, in the formation of the spermatozoa, the first polar division results in the separation of a bud of protoplasm without any division of the nucleus, while the second polar division is **not** a reducing division. Since the drone is developed from an unfertilised egg, the nucleus of which has already undergone " reduction," there is no need for a reduction division in the formation of his germ cells.

We can also see why Mr. Barratt was successful in fertilising drone eggs (see THE BEE WORLD, December, 1919, p. 141), while some others who have tried in times past have had negative results. The facts set forth indicate that eggs for this purpose must not be more than a few hours old ; for if the female pronucleus has had time to reach the point D, Fig 90,it is probable that fertilisation is in general impossible. It would be interesting if experiments were made to ascertain exactly how long a drone egg remains fertilsable ; and whether it be possible sometimes to fertilise an egg after the first cleavage division had taken place. In this latter case, one would expect a **hermaphrodite bee** to result (see **"The Honey Bee,"** p. 165), if one cleavage daughter-nucleus were fertilised and the other not. Possibly this is how these freak bees arise in nature ; the spermatozoa in an old queen may well be fewer and less active, and so fail to reach the egg-nucleus before it gets to D and starts dividing.

Dzierzon's theory is thus supported by the cytological evidence ; and this is the case not only for the hive-bee, but also for wasps, ants, and several kinds of solitary bees (though in the case of some of these, some difference of opinion prevails as to the proper interpretation of the observed facts.).—ANNIE D. BETTS.

NOSEMA IN THE CARDER BEE.

Since writing the article on this subject in the January, 1920, BEE WORLD, I have made some more observations which may be of interest. On June 19th, a specimen of **Bombus agrorum** was found in the garden, crawling. On examination, the cells of the chyle-stomach appeared to be more heavily infected with **Nosema** than is usual. Possibly this **Bombus** is only adversely affected when the chyle-stomach is heavily attacked ; as will be remembered, in most cases the parasite is more or less confined to the Malpighian tubules. The comparatively great mortality in the hive bee when attacked by **Nosema** would then be understandable, as infection in this case is mainly or wholly in the chyle-stomach.

In preparing slides, the smears can be fixed by exposing them to formalin vapour for an hour ; but nothing that I have so far tried appears to be superior to fixing in the flame, mordanting in 10°/₀ Jeyes fluid for an hour, and then staining overnight in Giemsa, as described in the January article.—A. D. B.

THE THIRD LEG SPINE.

In certain of the wasps (social and solitary), wild bees, and humble bees, there are two conspicuous spines on the tibia at its distal end. These are wanting in the hive bee ; and their presence in humble bees shows that this is not because they would interfere with the loading of the corbicula. A curious fact, pointed out by von Buttel and noted by Zander (" **Der Bau der Biene,"** p. 45) is, that there is a blunt projection on the leg of the pupa of both sexes at the point where the spines would be, if present. This shows that the hive bee once possessed these spines, but has lost them. In this connection the accompanying sketch may be of interest. It represents the third leg (side next the body) of a queen. I have examined several other queens, but have so far failed to find another specimen with this peculiarity. The spines in the wasp and humble bee are provided with a comb like array of short stiff hairs along the edge ; no hairs are present onthe spine shown in the sketch, but the surface is striated in a manner suggestive of closely-appressed hairs.

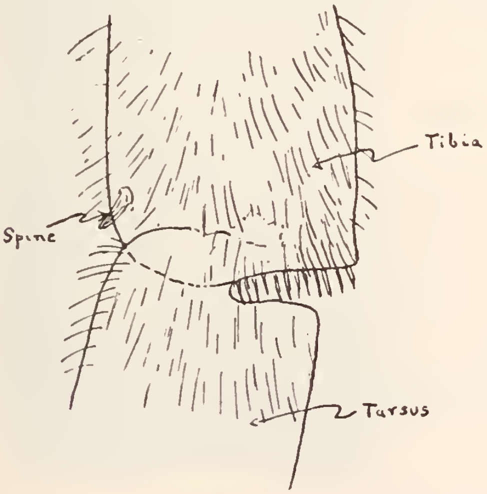
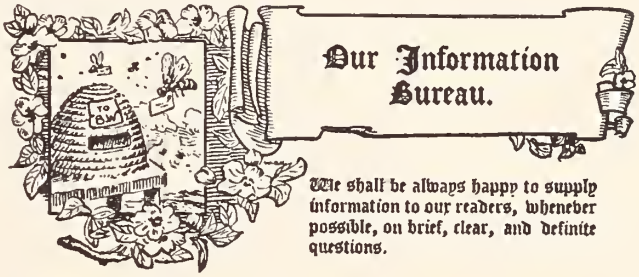


Fig. 7.

If, as is possible, the function of the third leg spines is to clean the wings, or the abdominal spiracles, their absence in the hive bee is understandable. She does not burrow in the earth, or feed habitually in dirty and sticky places, like some other bees and wasps. Moreover, she possesses a most effective tool for cleaning her abdomen, namely the " curry-comb " on the inner side of the planta. The spines have therefore probably disappeared owing to disuse, and to the absorption of the available growth-energy by the development of the various specialised structures on the third leg.

It would be interesting to know whether the above is the real use of the spines. I have noticed bees using the spine on the **second** leg to scratch the base of the wing, whether to clean it or not could not be determined.—A. D. B.



Our Information Bureau.

We shall be always happy to supply information to our readers, whenever possible, on brief, clear, and definite questions.

The seeds of knowledge may be planted in solitude,
but must be cultivated in public.—JOHNSON.

HONEY CANDY. This is decidedly far superior to fat candy or to plain sugar candy. For ordinary use, the following composition formula will answer your purpose : 6 lbs. pure cane sugar, 4 tablespoonfuls of honey, a good pinch of salt and one tablespoonful of vinegar. The candy is made in the usual way. Some harmless germicide may be added and stirred in (by way of a preservative) whilst cooling, prior to moulding.

THE RECTANGULAR DEEP FRAME. The size of this frame is 12″ × 20″. It is strongly made and well wired by Messrs. James Lee & Son, of Uxbridge. We have been responsible for the introduction of four frames based on this principle, for reasons already detailed in this magazine, also in the **B.K.R.** The sizes are 12″ × 20″, 12″ × 15″, 12″ × 10″ and 12″ × 5″. They are meant to suit different districts and different methods of management. The second size (12″ × 15″) appears to head the first in popularity, and the last two are intended for extracting.

It is quite incorrect that bees of a strong colony will not go to the super, whether of shallow frames or sections, if they have a large brood chamber. A strong colony of bees will do wonders even in a single week of honey flow. There are several tricks for inducing bees to a crate of section, such as the insertion of one or two old sections and the employment for a while of a slow feeder on the top. Rehearsal from books is no argument against the deep frame. Every one is master of his own method and intolerance is no guidance. Indeed, " except for their vanity, it would be impossible to please some people."

We do not find any inconvenience in handling even the 12″ × 20″ frame solid with brood and food, when handled to our convenience from any accessible part, and not according to the text book fashion. We hold the frame as we would hold a slate, with the single precaution of not holding it horizontally.

The deep frame could be accommodated in the ordinary W.B.C. hive by the use of a special stock box, and could be supered with section crates or shallows (12″ × 5″ for instance).

The new deep standard (14″ × 12″) was introduced for a different purpose, namely, the adaptation of a large frame to ordinary British hives. We never doubted that a still larger frame would come in use and we were not surprised to learn that the **Harvester** or **Double Standard Frame** (14″ × 17″) introduced by Mr. Dudley Fielden was being manufactured by Mr. S. J. Baldwin, Bromley, Kent. It approximates to the new Dadant frame. By the use of such a large frame Mr. Fielden was able this season by intelligent management to secure a fairly good surplus when many beekeepers in his districts secured nothing with their small brood chambers.

TRAPPING ANTS.

Beekeepers in warm countries, such as Portugal and Egypt, practise the exposure of honey under a coarse wire cover which will allow access to the ants but not to the bees. Directly the ants are induced to frequent it in number, the bait is poisoned with a non-odorous chemical such as an arsenic compound. This will ultimately mean the destruction of the whole colony of ants.

If you can discover the ants' nests these should be destroyed. Over each nest bore 3 or 4 holes, each a foot deep and charge with half an ounce of carbon bisulphide, then plug with earth. The poisonous gas will do its work within 24 hours. In view of its explosive nature, care should be taken to avoid the use of a flame or light where stored or when used.

Petroleum or creosote cups under the legs of the hives are effective as preventatives.

WAX FOUNDATION.

A swarm hived on sheets of foundation may start building either in the centre or at one side of the hive, if the frames are perpendicular to the entrance. If they run parallel to it, the bees generally start at the back of the hive, or in the centre and not frequently at the front. It will be seen therefore that the presence in the hive of foundation of different makes has nothing to do with this habit of bees and with acts of coincidence. The experienced beekeeper knows that it would be unreasonable to suggest that just because a swarm started working at the back of the hive on the foundation of a certain brand, therefore the foundation in front of it from another brand must be inferior, when an immediate reversal of order is rarely known to make a difference to their selected point of starting.

THE CHAPMAN HONEY PLANT.

We carefully watched bees working on the spherical flowering heads of this graceful plant and entirely failed to discover that it is to blame for occasionally having some bees on it apparently in the stupefied condition of which Dr. Miller complained (**Gleanings**, December, 1918). We have counted seven and sometimes more bees on one head, actively working and examining the flowers, even at an August temperature of 55° F. During July, they were to be seen daily on it until 9 o'clock in the evening and maintained the same interest during August, working from early in the morning till after sunset. Little wonder that occasional chilled bees are met with on rainy days or cold evenings as met with on other flowers liked by the bees, such as mignonettes.

As you surmise, Mr. Harwood has never suggested that a bee garden would be the means of honey production. Such a suggestion would be too ridiculous to comment upon. We have not seen any criticism of his writings to that effect and we generally receive many appreciative letters on "Apis and Flora." Obviously such an unjustified criticism is based on the unfortunate habit of some beekeepers not crediting others with at least an equal measure of common sense.

QUEEN LAYING ON POLLEN.

We have seen this repeatedly and have also seen a supersedure queen cell, the basis of which is a pollen cell in which the queen laid. Normal development takes place, and there is no reason to expect otherwise.

"VICIOUS" BEES.

You will be very unwise to requeen when you have such healthy and active bees with a surplus of nearly fifty pounds of honey, which is very good in a London suburb and in such a wretched season as this. "Hybrid" bees are a little "serious" but they generally return with the goods and their occasional anger should call for a study of the best conditions for their manipulation, if necessary, rather than the condemnation of a good queen. We have no hesitation in recommending Italian-Carniolans. We do not find them "vicious," on the contrary.

RAGGED QUEEN WINGS.

In a fertile queen this is supposed to be due to the effect of the rubbing of her wings against the cell wall in the act of ovipositing. In a virgin queen this is very rarely encountered, and is possibly due to not using her wings during weeks of prolonged unfavourable weather. Possibly the same factor may contribute to the deformity of the wings of a fertile queen or through disease of the blood vessels. There is a modern tendency to believe that during the honey season a fertile queen takes occasional airing flights.* This may possibly have a tonic effect on her wings.

WILLOW HERB AS A HONEY PLANT.

Willow herb, also known as fireweed **(Epilobium angustifolium)**, is decidedly a valuable honey plant if abundant. It grows wildly in forests, especially following fires. The flowers are rose pink and appear in succession from May till August. Seeds can be sown outdoors in August if not done early in spring. If roots are available divide in October. It will serve as a border plant, preferably in a shady position, looking very attractive. Ordinary soil will do quite well for it.

U.S. PUBLICATIONS ON BEES.

These are to be had from the Division of Publications, Department of Agriculture, Washington, D.C. Dr. White's technical paper "**American Foul-brood**" is supplied at 15 cents per copy.

CAUSES OF SUPERSEDURE.

These are several, some proven and some conjectured, e.g., a failing queen, and a lost queen through balling (the result of unjudicious interference), robbing or through an airing flight. We have accidentally met on two occasions, whilst opening hives during the honey flow, with two active fertile queens imprisoned in the cells whilst laying. We found it necessary in both cases to tear down the walls of the cells with a long pin, in order to liberate the queens. Both appear to have been in this condition for a long time as they were exhausted when released. In both instances the bees showed external signs of restlessness and some were frantically endeavouring to release the queens when the combs were being examined.

THE TOXICITY OF ANTISEPTICS.

Our reason for recommending "**Yadil**" (Trimethenal Allylic Carbide Compound) for internal administration to bees with their food or water, when such administration is advisable, e.g., as a supplementary to the shake treatment of foul brood, is because of its vegetable origin and its non-toxicity which permits of the safe administration of massive doses. The following table from the Report of the Registrar-General of Births, Deaths and Marriages (England and Wales) covering the year 1918, shows no less than seventeen antiseptic agents, several of which are usually stated to be non-toxic, but nevertheless proving to be only comparatively so in practice. The tissues of the bee, which are more delicate than human tissues, naturally demand careful consideration in the selection of an internal germicide and there is little wonder that when ordinary germicides are tested they often prove to be more harmful to the bee than to the pathogenic organisms.

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* THE BEE WORLD, Vol. I., p. 168 and p. 193.

Poison.	Negligence and Accident. 1916	Suicide. 1916	Negligence and Accident. 1917	Suicide. 1917	Negligence and Accident. 1918	Suicide. 1918
Boric Acid	—	—	1	—	—	—
Carbolic Acid	10	45	9	32	12	30
Chlorine	—	—	1	—	—	—
Coal-tar and Preparations	—	—	—	—	1	—
Creosote	1	2	—	—	—	1
Formalin	1	—	—	—	—	1
Izal	2	—	—	2	—	—
Jeyes' Fluid	1	—	—	—	—	—
Lysol	—	1	2	1	4	7
Mercury Perchloride ..	2	4	2	—	1	6
Potass Permanganate ..	1	—	1	—	1	—
Quinine	1	—	—	—	4	—
Sanitas	1	—	—	—	—	—
Thymocresol	1	—	—	—	—	—
Toxol	—	—	—	—	—	1
Zinc Chloride	—	—	1	—	—	—
Zinc Sulphate .. .	1	—	1	—	—	—

Research students in the United States can obtain "**Yadil**" from Messrs E. Fougerã & Co., Inc., 90-92, Beekman Street, New York. In Australasia it is obtainable from Messrs Histed and Histed, Auckland, N.Z.; and in South Africa from Messrs. Pattison Bros., of Johannesburg.

We shall be pleased to publish your experience with this antiseptic and shall be glad to hear from other researchers abroad.

SKEP BEEKEEPING. For honey production and from a scientific point of view, skep beekeeping is not to be recommended. To the average beekeeper a skep is a sealed book and is quite beyond his means of control. For breeding purposes, on the other hand, skeps are invaluable to those apiarians who are sufficiently interested and experienced in their management, including the prevention of disease. We find bees doing very well in painted skeps. Skep colonies may be fed in the season during unfavourable weather with candy placed on the back part of the floor board. Candy feeding during the season is not objectionable. It saves time and acts stimulatively.

FIRE BLIGHT. Bees used to be accused of spreading fire blight, but the researches of Dr. Merrill and others, apart from the observations of practical beekeepers, have disproved this contention. The aphids are now considered to be responsible for the propagation of the disease.

GRAFTING. Queen rearing by grafting is an ingenious scientific procedure. Commercially it is not economical unless done on a large scale. The commercial beekeeper who has to study economy more than perfection has to utilise whatever good method of queen-rearing lends itself to his circumstances.

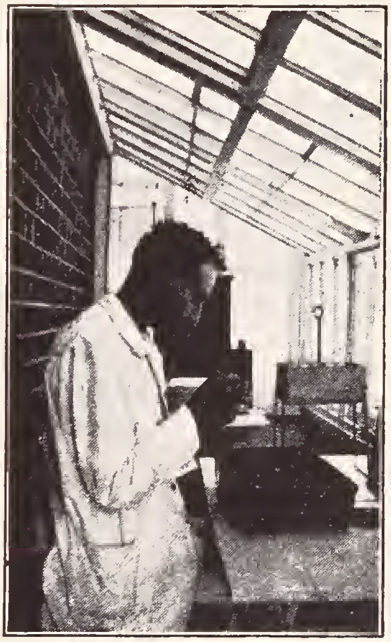
With three colonies, unless you wish to keep them and spend on them for study, queen-rearing by grafting, especially by one who has not practised it before, will in all probability end in failure. Study the subject carefully in advance. We recommend Pellett's "**Practical Queen Rearing,**" obtainable from the American Bee Journal Office, Hamilton, Illinois, at one dollar.

Before you consider yourself morally entitled to supply the public with queens, you should master the subject, raising and testing in the first place your own queens. You will need to increase your stock to say eight colonies, keeping three for honey production, two for increase and three for queen-rearing, thus securing the equilibrium necessary for a self supporting and a prosperous apiary.

It is a paying investment to obtain (on combs) from the beginning two or three "**Breeder Queens**" from reputable breeders. These are mother queens raised from strains of special distinction. By keeping records of the work of their progeny under similar circumstances and by noticing the development of their respective colonies, you will be able to make your selection. It would be unnecessary to wait for two seasons, seeing that they have already been thoroughly tested by the supplier and you are merely making your own choice. In fact an old breeder queen is likely to be superseded at any time and the earlier you make your selection the better.

The equipment for queen rearing is not unduly costly for moderate work and in your case you will certainly not require a **Grafting Room**, which is of special service only to large beekeeping establishments. You can do grafting in the open air on hot days or in a warm room in the house.

The illustration below is one of a glass house grafting room provided with the necessary equipment, including a stove, thermo-



Figs. 12—13.—The Grafting Room, Adminson's Apiaries, Benson, Oxon.

meters, tables for accommodating combs, etc., and queen incubators. We find this kind of Grafting Room advantageous under English conditions of changeable weather and unstable temperature.

A few mating hives which can be stocked from your colonies that are kept for increase will be necessary. For many reasons the "**Edward" Nucleus Hive** † has much in its favour.

The subject is too wide to be dismissed with a few comments. There are several excellent manuals which are helpful, but you will not be the loser by sticking to a good popular manual to begin with.

HONEY FOR BEE FEEDING. Very few people object to feeding bees on honey. When the causes of their objection are analysed one cannot help thinking that they used for this purpose poor and sometimes infected honey and expected their bees to do well. Sugar feeding is undoubtedly superior to low grade honey feeding, but when good honey suitable for wintering is selected it will not be surpassed. The question is how many beekeepers would really care to take such interest in their bees. That it does not economically pay is one thing and that it is scientifically wrong is another, but argumentarians do often mix up the facts of the case.

We have recently purchased half a ton of N.Z. honey for bee-feeding from the Dominion Offices, Strand, London, at 1s. per lb., carriage extra. It arrived in good condition and proved excellent in quality. Being granulated, we used for its liquifaction half a pint of water per lb. of honey. Although it is advisable that the syrup honey should be allowed to boil for 20 minutes or more before temporary storing it, until given to the bees in the evening, in practice it will be found very difficult to prevent over-boiling. We recommend therefore medication instead of excessive boiling, which, in fact, cannot be done in the ordinary way and, further, depreciates the nutritive value of honey by destroying its vitamine contents. New Zealand is a country where rigid elimination of disease is observed and its honey supply is therefore trustworthy.

Writing about honey feeding, we are reminded of our repeated observation that it is distinctly more stimulative to breeding than sugar feeding.

CANADIAN HIVES. These are built on practically the same lines as American hives.

The Standard Hive is made of ⅞" white pine and is dove-tailed at the corners. "It consists of reversible bottom board, brood chamber, super cover, telescope outer cover with metal top, and is furnished with ten Langstroth-Hoffman frames, resting on pin babbets. The ten frame size is 16¼" × 20" outside and 9$\frac{9}{16}$" deep. The body of this hive is exactly the same as the Standard super for extracting purposes and may be used as such."

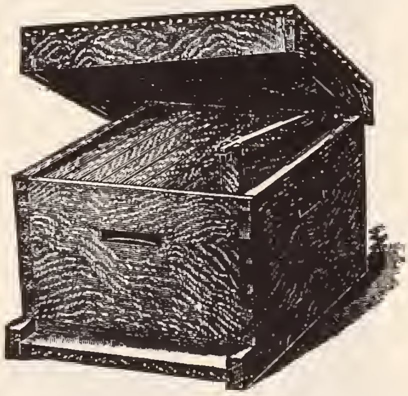


Fig. 14 —One-storey Standard Hive with metal cover.

You must admit that it is not fair to expect the first attempt to produce similar hives in England to be quite a success. We have three Manley hives in use and all the three are not devoid of rain water on the floor boards, but we have no doubt that the hive will be gradually perfected, probably through abandoning one or more of its features. Unless the public are prepared to encourage enterprise and in a sporting attitude share in the results, it is difficult to see how could any forward movement be effected.

Of Canadian and American hives having an insulating feature, the "Buckeye" double-walled hive is popular.

The construction of this hive is so designed as to give practically all the chief advantages of a single-wall hive plus the insulating features of a double-walled hive. "It is constructed of white pine, ⅜" thickness, with dove-tailed corners, and may be packed with ground cork, shavings, or other material.

This hive is considered by its champions not only fit for wintering bees in cold climates, but also capable of maintaining an equal temperature, which is conducive to brood rearing late in the Fall and early in the Spring, thus insuring a large force of bees for the early honey flow. The top of the hive is so constructed that single-walled Standard or shallow supers may be tiered up to any height desired. The 'Buckeye' consists of reversible bottom board with removable entrance block, double-walled brood chamber, ten Langstroth-Hoffman frames, super cover, chaff tray, and telescope cover with metal cap."

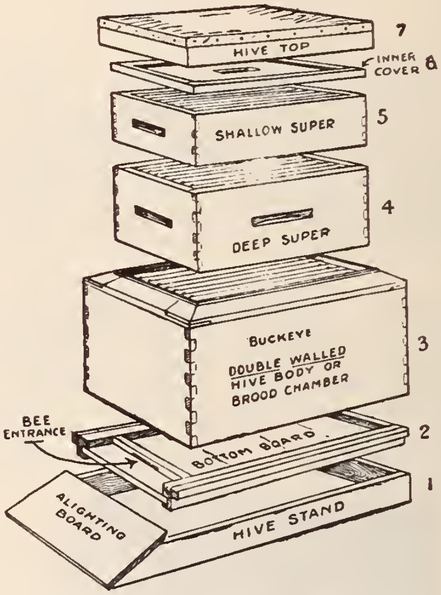


Fig. 15.—The "Buckeye" double-walled hive.

Needless to say, any hive is a perfect instrument in the hands of its interested champion and if a beekeeper has no interest in a particular hive and fails to see its advantages, he is the loser by having it. Interest is most essential for success. This will explain why, with an unbiassed mind, we are prepared to believe the beekeeper who asserts that he is more successful in honey production by employing sugar box hives than by having the most popular modern ones, although his success would probably have been greater with the latter had he got towards them a similar tolerance and interest.

CARNIOLAN BEES. They have **no** grey bands but distinct broad whitish yellow ones which, on the dark background, appear at a distance greyish. The workers are therefore quite distinguishable from Dutch workers. The queen, on the other hand, closely resembles a Dutch queen. Carnilaon drones are quite distinguishable from ordinary "black" or Dutch drones, since they are as prettily marked as the Carnolian workers. This is very interesting in itself since the drones of almost every other race of hive bees are differently marked from the workers.

They propolise very little, are recognised to be unsurpassed for section honey in view of their white capping, and are very quiet on the comb. In our experience Italian-Carniolans and Carniolan Natives are still better than pure Carniolans in foraging activities.

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† THE BEE WORLD, Vol. I., p. 170.

Any beekeeper who does not believe in a large brood chamber is ill advised to keep Carniolans. He is sure to bring discredit to himself, to the bees, and to the supplier.

DOUBLE MATING.

It has been proven by observation that queens occasionally do mate more than once before laying.

Supposing that the drones belonged to different races, it is difficult to deny the admixture of spermatazoa in the spermatheca or seminal sac. One is faced therefore with a puzzling problem in judging the progeny of such a queen in the light of Mendelism.

THE CULTIVATION OF ALFALFA.

Alfalfa or Lucerne (**Medicago sativa**) is recognised, especially in the "States," as an important honey plant. It is a long-lived perennial, doing best in rich alkaline soil in the South of England. Gravel soil however will do for it, provided it is free from weed and is well limed and drained. "Once established," says Pellett,‡ "a field of alfalfa continues to return valuable crops year after year. From two to five cuttings are secured each season, depending upon the available moisture and the length of the growing period.... From seven to twenty pounds of seed are required per acre. If good seed is used and put in with a drill, ten to fifteen pounds should be ample."

CLOGGED POLLEN COMBS.

Many practise with success soaking such combs in water and then drying them in the sun, so that by swelling and subsequent shrinking, the pollen masses are loosened from the cells and can be shaken out. Those cells that are not cleaned may be broken down. The bees when given the combs will do the rest.

LONG-TONGUED BEES.

Dr. Miller's reply in the **Am.B.J.** to a similar question is admirably sound. The learned doctor says: "I think there is an advantage and there may be a very great advantage in long tongues. In actual practice, however, I have come to doubt whether it is still worth while to pay any attention to the length of the tongues. Breed from the stock that gives best results. Very likely that may in most cases give long tongues, but whether tongues are long or short, we want bees that will get the most honey. Unfortunately, the quality of tongue length does not seem always to be handed down to succeeding generations."

As to the interest of honey bees in red clover, they are known occasionally to work on the second crop.

METHODS OF SUBJUGATION.

It is a mistake to think that one method of subjugation will do for all bees. For instance, we find the carbolic cloth the wrong thing to use for Egyptian bees. On the other hand, they are easily subjugated by means of the smoker, provided the temperature is favourable (70° F.) and there is no wind or breeze. Under such conditions they could be handled without a veil as Mrs. G. B. Mitchell, of Portugal, who visited our apiary this season, Mr. Harwood and others will testify. But generally speaking the carbolic subjugator or the carbolic cloth is more humane and handy.

SUPERSEDURE AND SWARMING.

It is known that as an alternative to destroying the swarming queen cells, should prolonged unfavourable weather upset their preparation for swarming, the bees do occasionally supersede their queen, although she may be of first quality. Prolonged bad weather appears to have in one way or the other a demoralising effect, so to speak, on bees.

TRANSFERRING BROOD

During July it would be safe to observe that no less than three combs of brood are left to a strong colony if it is to be deprived of capped brood for strengthening a weak lot. Examine the brood carefully before transferring, to ascertain that it is healthy.

CANDY FEEDING.

The discussion on candy feeding was started in the first issue of THE BEE WORLD, based on actual observations on a comparatively large scale, and not on either quotations or a few experiments. The consensus of opinion appears to be in support of our views. There are occasions, however, when candy feeding is a boon, e.g., during prolonged unfavourable weather in the midst of the season, especially to a busy man with many developing nuclei on his hands. A most convenient form of supplying candy is in the shape of framed slabs. This can easily be done by framing a sheet of non-poisonous metal, whether plain or corrugated, and pouring the liquid candy in one trough and later in the other, when the former gets perfectly cool. A **frame of candy** so made is admirable as a stimulative nourishment to a nucleus, when placed outside the brood nest, although we admit the disadvantage of bees having to bring in their water, which may not be clean. Framed candy has been a great help to us during this year's wretched season and our readers to whom we recommended the method reported their gratification. It is worth adopting by the Trade, seeing that free sugar in any quantity is now available and candy could be made and supplied by the bee appliances manufacturers.

For winter feeding, a frame of candy resting flat on the top of the frames, above two or three top bars, acting as spacers below, and with similar top bars acting above as spacers under the quilt, will be useful as an extra ration for unforeseen emergencies. A bee hole in the metal sheet closed with paper when the candy is poured in will remove the necessity of a top spacer. The wisest beekeeper will not only do his winter preparations but even his spring feeding in the autumn. Plenty of losses attributed erroneously to disease are due to the **lack** of the following factors, whether avoidable or forced: (1) Protecting hive; (2) plenty of young bees; (3) plenty of wholesome stores.

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The Apis Club

Port Hill House, Benson, Oxon, England.

Organising Committee for Current Year: Miss Annie D. Betts, B.Sc., R. R. Babbage, Gilbert Barratt, A. F. Harwood, C. P. Jarman, Dr. T. D. Newbigging and R. Whyte.

Hon. General Secretary: A. Z. Abushâdy.

Provisional Constitution.

(Adopted for the current year by the Select Committee appointed by the first Annual General Conference held on May 29th at the Central Hall, Westminster, London.)

(1) TITLE.

The title of this International Institute shall be **The Apis Club.**

(2) OBJECTS.

(a) The stimulation and conduct of research work in bee culture.

(b) The development of scholarly and industrial co-operation amongst members of the **Club,** both at home and abroad, with a growing scope corresponding to the increase in membership from different lands.

(c) The uplifting of the standard of beekeeping in the United Kingdom, by the publication of educational literature and by other means of instruction.

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‡ **American Honey Plants,** p.16.

(3) COMPOSITION.

Members. Membership of the **Club** shall be open to all practical apiarists everywhere and to all lovers of the Honey Bee.

Associates. Associates of the **Club** are members who secure its Diploma in Bee Culture.

Scholars. Scholarships of the **Club** for conducting research work shall be limited to its associates by competitive examination.

Fellows. Fellowship of the **Club** shall be limited to distinguished researchers in apiculture.

(4) CONSTITUTION ANDPOWERS OF THE EXECUTIVE COUNCIL.

(a) The business of the **Club** shall be conducted by an Executive Council elected as the Annual Meeting and shall consist of 24 Councillors as follows :—Hon. President, Hon. Vice-President, Chairman, Vice-Chairman, Trustees, Organising Secretary, Associate Secretaries, Treasurer, and of additional representative delegates as defined in article 5.

(b) The executive Council shall meet at least quarterly at the offices of the **Club** in order to review and decide on its current finance, the conduct of the **Club's** work, and on any other matter which is not confined to the sole decision of the Annual Conference of members. A month's notice of the Agenda shall be given to each member.

(c) A special meeting of the Executive Council shall be convened for any urgent matter if seven councillors mutually decide on its convention. Not less than one week's notice of the Agenda shall be given.

(d) The Executive Council shall have power to elect, re-elect, or revoke, at any of their meetings, special committees for the efficient conduct of the work of the **Club**, by a specialised division of labour, and to delegate to them any of the powers of the Executive Council.

(e) The Executive Council shall have power at their meetings to formulate, amend, or revoke any bye-laws in conformity with the Rules of the **Club**.

(f) Seven Councillors other than delegates shall be deemed necessary to form a quorum of the Executive Council.

(5) REPRESENTATIONS.

(a) Any Beekeeping Society or Institute in the United Kingdom which has an official membership in the **Club** is entitled to appoint a delegate to attend the meetings of the Executive Council and to take part in its proceedings. Societies or Institutes with more than one hundred members are entitled to appoint an additional delegate for every additional hundred members.

(b) Any Beekeeping Society or Institute in the United Kingdom or abroad which has no official membership in the **Club** is entitled to send one representative to the Annual Meeting of members for the purpose of obtaining any desired information on the work of the **Club**, but without the right of taking part in the proceedings of the meeting unless invited by the Chairman, and without the right to vote.

(c) Any Beekeeping Society or Institute abroad having official membership in the **Club** has a right to appoint one representative in the United Kingdom to attned the Executive Council's meetings and to vote by proxy on behalf of the said Society or Institute.

(d) Any member of the **Club** in the United Kingdom or abroad is entitled to delegate his or her vote to a fellow member but must inform the Organisng Secretary of this decision in writing prior to the Conference of members.

(e) Any member of the **Club** is entitled to attend all meetings of the Executive Council but without taking part in its deliberations unless invited by the Chairman to do so, and without the right to vote.

(f) Any business beekeeping establishment in the United Kingdom or abroad is entitled to send one representative to the Executive Council's meetings and to the Annual Meeting of members subject to similar reservations as laid for Societies and Institutes under clauses (b) and (c) of this article.

(6) ELECTION OF OFFICE-BEARERS.

No honorary office-bearer other than a delegate is entitled for re-election more than once, except by a three-fourths majority of members at the Annual Meeting.

(7) SUBSCRIPTIONS AND DONATIONS.

(a) The minimum individual membership fee to the **Club** shall be 10s. 6d. per annum payable in advance, the membership commencing at any time. For Societies and Business Establishments the minimum annual fee shall be one guinea for every delegate appointed.

(b) Subscribers of £10 and upwards paid in one sum are eligible for election as life members.

(c) No resigning member shall be entitled to the return of his fee or donation to the **Club**.

(8) RESTRICTIONS.

(a) Any member deferring the payment of his or her fee for more than two months after it becomes due may be considered as having resigned from the **Club**.

(b) The Executive Council shall have full power to refuse the membership of any applicant and to erase the name of any member who deliberately acts against the rules of the **Club** or whose conduct is likely to be injurious to the interest of the **Club**, in both cases returning the membership fee or the balance of it.

(c) Before deciding on erasing the name of any member, the Executive Council shall secure, if possible, a written explanation from the accused member.

(d) Any applicant for membership or any member expelled from the **Club** shall be entitled to appeal to the Annual Conference of members, whose decision shall be final.

(9) GENERAL CONFERENCES.

(a) The Annual General Conference shall be limited (subject to the concession in article 5) to members of the **Club** whether as individuals, Societies and Institutes, or Business Establishments in the United Kingdom and to representatives of corresponding members abroad, and shall be held as early as possible in May.

(b) A Special General Conference constituted as above may be held on the decision of the Executive Council after a notice of not less than one month has been given to all the members of the **Club**.

(c) For formulating, altering, or withdrawing Rules of the **Club**, and for deciding on the disposal of its funds and its future, a majority of three-fourths of those present and voting individually or as proxies, at an Annual or a Special General Meeting shall be deemed necessary.

(d) Voting at all General Conferences of members shall be always by ballot.

☞ Notices

County and District Branches.—In view of many questions, suggestions and applications received relative to the matter of decentralisation, members in all districts are informed that we whole-heartedly approve of the creation of County and District Branches on any rules which are not inconsistent with the Provisional Constitution of **The Apis Club**. A modest beginning should not be a discouragement. Those who would be interested in such an expansion of the **Club's** work should communicate with the Hon. General Secretary at Benson, for the purpose of co-ordination.

Supply of Hives and Appliances.—A large volume of enquiries reach us regarding recommendations for bee supplies. Correspondents are reminded that we have no doubt about the integrity of all our advertisers and that in fairness to their interests they should communicate with them direct.

Copies of Prospectus.—Separate copies for distribution of the prospectus appearing in this number are available for any interested member on application.

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The Bee World.

THE OFFICIAL ORGAN OF THE APIS CLUB.

Edited by A. Z. ABUSHÂDY, F.R.M.S.

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BOARD OF COLLABORATORS.

In the United Kingdom.—Rev. John Beveridge, M.A., B.D., E.B : S.B.A., M.B.E. ; Miss Annie D. Betts, B.Sc. ; Rev. R. Doupe ; A. F. Harwood ; J. Herrod-Hempsall, F.E.S. ; C. P. Jarman ; W. H. Simms, B.B.K.A. ; and R. Whyte.

Abroad.—C. P. Dadant (U.S.A) ; Dr. Rocha D'Amorim (Portugal) ; M. G. Dervishian (Cyprus) ; C. Drieberg, B.A., F.H.A.S. (Ceylon) ; Lewis H. Gough, Ph. D., F.E.S. (Egypt) ; I. Hopkins (N.Z.); Mrs. G. B. Mitchell (Portugal); Frank C. Pellett (U.S.A.); Jan Strgar (Carniola).

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Literary Correspondence: Literary correspondence should be addressed to the Editor, accompanied by a stamped addressed envelope when a reply is expected. In view of the character of this magazine and the almost overwhelming occupation of the editor, he relies on the co-operative spirit and good nature of correspondents in avoiding on the one hand unnecessary correspondence, and in helping on the other hand to reduce the postal expenses of THE BEE WORLD and **The Apis Club** which are exceptionally heavy.

Having regard to the limitations of our space, our able contributors will greatly assist by considering 500 words a maximum limit for any single contribution as an article. Letters to the Editor for publication should be very brief.

Business Correspondence: All business correspondence should be addressed to the Manager of THE BEE WORLD and must be accompanied by a stamped addressed envelope when a reply is required. The manager will be pleased to reserve advertisements spaces for members of the Trade on application. Rates for displayed advertisements are as follows:

(1) **Front Page**: £6.

(2) Other publicity pages:

Full Page	Half Page	One-third Page
£5 0 0	£2 15 0	£2 0 0
Quarter Page	**One Inch**	**Half Inch**
£1 15 0	£1 5 0	£0 15 0

Subject to space not being reserved. A discount of 2½ per cent. is allowed on three successive insertions ; of 5 per cent. on six insertions ; and of 10 per cent. on a regular advertisement for one year.

The Supply of the Magazine: Subscriptions to THE BEE WORLD are limited at present to members of **The Apis Club** who are entitled to the free delivery of the paper. Non-members can obtain copies from their newsagents or from firms dealing with bee supplies at 9d. per copy, postage extra.

Beekeeping Societies having official memberships in the **Apis Club** can obtain in bulk copies of the paper at the following special rates:

25 copies	From 25 to 50 copies	More than 50 copies
8d. per copy.	7d. per copy.	6d. per copy
	(Post free)	

Back issues of THE BEE WORLD (second-hand or otherwise) as well as additional copies of the current number may be obtained, when available, by any member of the **Club**, on applying direct to its offices, at the cost of 10d. per copy, post free, unless ordered in quantity as indicated above.

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Keep Your Business Before the Public.

With the leading circulation which THE BEE WORLD possesses we can safely say that regular advertising in it makes two customers grow where one grew before. Advertising is to business what steam is to machinery—the grand propelling power. If you have no luck, it is probably your own fault; luck is often a matter of courage. Book at once a small regular advertisement. The cost is comparatively insignificant; the gain is a compound interest.

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Special Prepaid advertisements by members of THE APIS CLUB are inserted at the rate of one penny per word ; minimum : one shilling. For non-members: 3d. per 2 words ; minimum : two shillings. For box number: 6d. extra. A discount of 2½% is allowed for 3 insertions ; of 5% for 6 insertions; and of 10% for 12 or more insertions. Advertisements must reach us not later than the first week in each month for insertion in the corresponding month's issue.

INSURE AGAINST DISAPPOINTMENT—by getting your queens and bees from a place where I.O.W. has **never** existed. Italian queens and 3-frame nuclei, hardy and vigorous, bred for years in a cold North climate. List free.

IRISH HONEY—gathered principally from bramble, clover, and wild raspberry ; well ripened and matured ; in tins 7 lbs. to 56 lbs. each. Prices on application.

5% discount to members of The Apis Club ordering bees or honey. Members when ordering are requested to forward their cards.—S. Crawford, Apiaries, Castlederg, Co. Tyrone, Ireland.

CYPRIAN BEES—For the finest strain of Cyprian bees which have won for themselves an international reputation apply to: Mihran G. Dervishian, Nicosia, Cyprus.

CONNECTICUT QUEENS—Highest grade three-banded Italian Stock guaranteed to give satisfaction. Queen and drone mothers are selected from stock of proven worth in hardiness, gentleness, honey production and disease resisting qualities. Select Untested Queens, each : 1 dollar 25 cents. ; 6 : 6 dollars 50 cents. ; 12 : 12 dollars ; 50 : 47 dollars 50 cents. ; 100 : 90 dollars.—A. E. Crandall, Berlin, Conn., U.S.A.

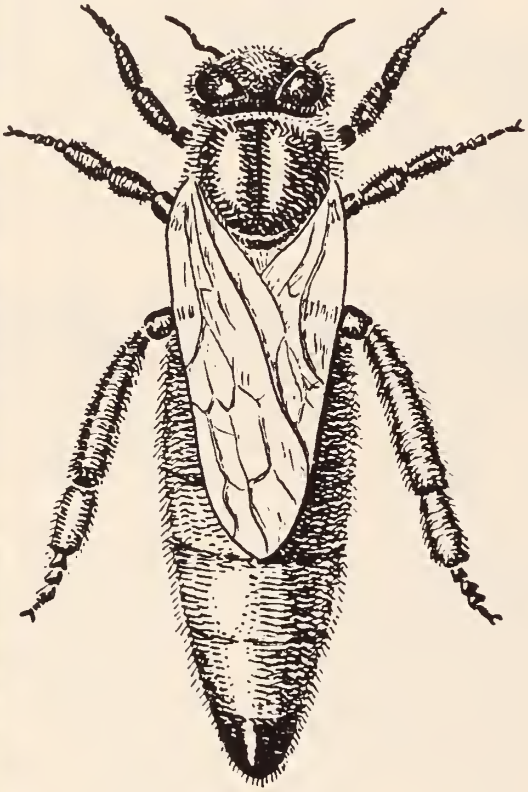
WANTED—"British Bee Journal" volumes, either bound or unbound (preferably the latter) for the years 1886-1899 inclusive. State price per volume and for the whole series specified.—M. C. Richter, Box 688, Modesto, California, U.S.A.

THE "ROYAL CARRIAGE QUEEN INTRODUCING APPARATUS—The latest device for indirect queen introduction. A valuable, durable appliance which is intended for frequent use over many years. The best material and workmanship displayed. 2s. 9d. each, post free. 10% discount to fellow members of **The Apis Club**.—E. W. Dempster, 169, Balfour Road, Ilford, Essex.

LANTERN SLIDES ON BEEKEEPING.—Photomicrographic Slides of the anatomy of the Honey Bee. Slides showing practical manipulation. Prints on approval.—Rev. G. H. Hewison, M.A. (First Class Expert B.B.K.A.) Marr Vicarage, Doncaster.

QUEENS

The Mother Queen is the Life of the Colony.



No Apiarist worthy of the name would consider a commanding price too high for a first-class **Queen.**

◆ ◆ ◆

All our **Queens** are of one standard : **The Best—Selected and Tested** from the most renowned Carniolan and Italian Strains.

We are now actively booking for the Coming Season.

1921 Price List on application.

TRADE MARK (REGD.)

ADMINSON Ltd. SCIENTIFIC APIARISTS,
BENSON, OXON.

Telegraphic Code : A.B.C. 5th Edition.

Dated 4th October, 1920.

Adminson Limited

Issue of 3,000 Ordinary Shares
of £1 each.

PROSPECTUS.

A Copy of this Prospectus has been filed with the Registrar of Joint Stock Companies.

The Subscription List will be opened on the 10th day of October, 1920, and will close on the 25th day of October, 1920.

Provincial and Over-Seas applications received subsequent to the closing date will have attention.

Adminson Limited

(Incorporated under The Companies Acts 1908 to 1917)

Capital £7000

divided into 7000 Ordinary Shares of £1 each

Issue of 3000 Ordinary Shares of £1 each, on all of which there will be payable 2s. 6d. per share on application, 7s. 6d. per share on allotment, 5s. per share three months after allotment and the balance six months after allotment.

The Certificates will be ready for issue so soon as the payments on the shares are completed.

The Company has up to date issued for cash 3699 Ordinary Shares, of which 2204 are now fully paid, and on 1495 of which £467 15s. 0d. in all has been paid.

Directors:

AHMED ZAKY ABUSHÂDY, Esquire, 21, Cairn Avenue, Ealing, London, W., and Port Hill House, Benson, Oxon. Physician. Egyptian Apiarist and Journalist (Chairman and Managing Director).

ROBERT LEE, Esquire, George Street, Uxbridge, Middlesex, Chairman of James Lee & Son, Ltd.

ARTHUR WILLIAM JOHNSON LAW, Esquire, 514, High Road, Chiswick, W., Solicitors' Managing Clerk.

Bankers: Messrs. Barclays Bank, Ltd., 132-134, Fleet Street, London, E.C.4.
Solicitors: Messrs. Finnis Downey Linnell & Chessher, of 5, Clifford Street, London, W.1.
Auditor: J. F. Lawler, Esq., of The Park, Ealing, London, W.5, Accountant.
Secretary and Registered Offices: Arthur W. J. Law, Esq., Port Hill House, Benson, Oxon.

PROSPECTUS.

The Company was incorporated in 1919 as a Private Company, but has since been turned into a Public Company with increased capital.

The objects of the Company are set out in its Memorandum of Association, but it was established in particular for the purpose of carrying on the business of bee-keepers and bee-farmers, and to develop and improve bee culture and the bee industry in Great Britain on scientific lines ; to establish and work apiaries ; to produce, manufacture and acquire, sell and dispose of bees, honey, beeswax, bee hives and all bee appliances and bee supplies ; to establish and maintain training colleges and centres and print and publish journals, pamphlets, books and papers in relation to the bee industry ; and generally to manufacture, acquire, produce, buy and sell and deal in everything relating to bee-keeping and the bee industry.

The Company is the proprietor of the popular magazine "THE BEE WORLD," which, in the short space of a year, has attained great popularity amongst the bee-keeping community, despite the difficulties which inevitably confront any new publication.

A loss of about £900 has resulted from the year's publication of the paper. This, however, is probably the experience of every new magazine in its early life, and the rapidly increasing subscription list and advertisement income of "THE BEE WORLD" and the still growing interest in the paper, clearly indicate that, given sufficient working capital to ensure regularity of issue (on which advertisers naturally insist) the paper should quickly become self-supporting and eventually prove a profitable proposition.

"THE BEE WORLD" up to the present has been supplied to members of the **Apis Club** only, but it is now proposed to place it on sale through the usual channels in addition to circulating it as the official organ of the **Apis Club.** This course and the conversion of the Company into a Public Company was recommended by a Select Committee of the **Apis Club** who expressly recognised the unselfish endeavour of the Company to elevate the standard of the bee-keeping craft at the cost of a present disadvantage to its ordinary trading.

One result of the conversion of the Company from a Private to a Public one is that the number of shareholders may now be increased indefinitely, and it is hoped that all lovers of "THE BEE WORLD" will apply for shares in the Company in order that its development and permanent success may not be hampered by lack of working capital.

The Company expect (and, in fact, has already received assurances of) support from distinguished bee-keepers as well as from leading members of the industry who appreciate its co-operative rather than competitive aims, and it is hoped that the rank and file of bee-keepers will add to their interest in the paper by applying for shares in the Company which owns it, both from a business and an educational point of view.

The Company has a large apiary at Benson, Oxfordshire, which is being placed on such a footing as to enable considerable business to be done next season.

It is also proposed to establish a metal work factory at Benson for the purpose of manufacturing "Adminson" Metal Comb Foundation. The Directors have great confidence in the future of this product, the manufacture of which has hitherto been hampered by lack of the necessary capital. It is intended so soon as the necessary machinery has been perfected to produce this foundation on a commercial scale. Numerous enquiries and orders for this comb foundation have been received by the firm through which the Company proposes to market the article, and, given the necessary capital, a profitable business should result. There is also a demand for metal bee-keeping appliances which could be produced at the factory and a ready medium for their sale is to hand in existing business establishments.

There are mortgages on the freehold property of the Company for £300 and £200 carrying interest at the rate of £6 per cent. per annum and £7 per cent. per annum respectively.

The minimum subscription upon which the Directors may proceed to allotment is fixed by the Articles of Association at seven shares.

The following agreements have been entered into :—

1. Agreement dated 15th April, 1919, between Thomas Duckworth Yates of the one part and the Company of the other part.
2. Agreement dated 11th September, 1919, between the Company of the one part and Ahmed Zaky Abushâdy of the other part.

The above Agreements may be inspected at the Offices of the Company's Solicitors, Messrs. Finnis Downey Linnell and Chessher, 5 Clifford Street, London, W.1, on any working day (except Saturday) whilst the list remains open, between the hours of 11 a.m. and 4 p.m.

Applications for Shares should be made on the accompanying form and sent to the Company's Offices addressed to : The Secretary, Adminson Ltd., Port Hill House, Benson, Oxon, with a cheque for the amount payable on application.

If no allotment is made, the application moneys will be returned in full, and if the number of Shares allotted is less than that applied for, the surplus application moneys will be applied in payment or reduction of the amount payable on allotment and any balance will be returned.

Failure to pay any instalment will render prior payments liable to forfeiture and the allotment liable to cancellation.

Interest at the rate of 10 per cent. per annum will be charged on instalments in arrear.

4th October, 1920.

Adminson Limited

Issue of 3000 Ordinary Shares of £1 each.

FORM OF APPLICATION.

To the Directors of
ADMINSON LIMITED.

Gentlemen,

I (or we) beg to hand you herewith £ : : being a deposit of 2/6 per share on Shares in the above-named Company and I (or we) request you to allot me (or us) that number of Shares on the terms of the Company's Prospectus dated 4th day of October, 1920, and of the Memorandum and Articles of Association, and I (or we) agree to accept the same or any smaller number that may be allotted to me (or us) and to pay the further instalment of 7s. 6d. per Share on allotment and the balance due in respect of the said Shares in accordance with the terms of the said Prospectus, and I (or we) authorise you to register me (or us) as the holder(s) of the Shares allotted to me (or us) hereunder. I (or we) hereby declare that this application is not made by or for the benefit of any enemy subject within the meaning of The Trading with the Enemy (Amendment) Act, 1916.

Name in full (Mr., Mrs. or Miss) ____________________

Address ____________________

Occupation ____________________

Date ____________________ 1920

Signature ____________________

All Cheques must be made payable to the Company and crossed to the Co.'s Bankers, Messrs. Barclays Bank, Ltd.

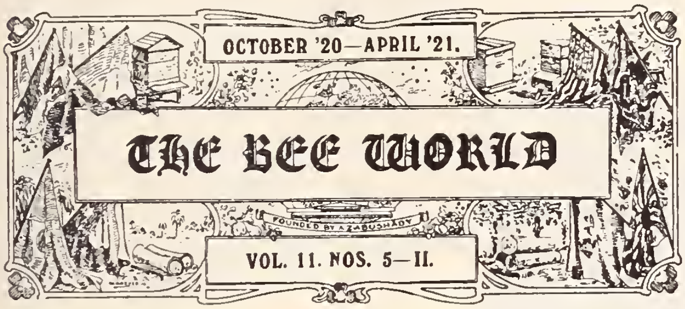
Adminson Limited

RECEIPT FOR DEPOSIT ON APPLICATION.

Received this day of 1920, from

the sum of £ : : being a deposit of 2s. 6d. per Share on Shares of £1 each in the above Company.

For **Adminson Limited.**


OCTOBER '20—APRIL '21.
FOUNDED BY A. Z. ABUSHADY
VOL. 11. NOS. 5—11.

THE BEE WORLD

An International Monthly Journal devoted to the progessive interests of Modern Bee Culture.

Edited by - - A. Z. ABUSHÅDY.

In vindicating the freedom of the Press, THE BEE WORLD gives full publicity, on questions affecting the advancement of Bee-keeping, to the views of all responsible writers, irrespective of their school or nationality, and without necessarily sharing their opinions. No literary responsibility can therefore be held by this Journal for signed or quoted contributions.

Publishers :

The Apis Club, Port Hill House, Benson, Oxon, England: An International Institute for the service of Modern Apiculture, and for fostering a genial spirit of scholarly brotherhood amongst bee-keepers of all countries, with the co-operative object of promoting their educational and material interests.

*** Membership of the **Apis Club** is open to all practical apiarists everywhere, and to all lovers of the Honey Bee. Annual membership Fee: 10s. 6d., and includes free delivery of this Magazine.

Vol. II. Nos. 5-11. OCT., '20—APRIL, '21. Mid-Monthly.

Editorial.

"CRAWLING DISEASE." An interesting communication from Mr. Sturges dealing chiefly with the so-called "Crawling Disease" appears in this number, and merits careful study. Whilst endorsing his observations, we beg to differ from his conclusions for the following reasons:—

(1) The cry raised last season about the so-called "Crawling Disease" emanated either from novices who are filled with horror at the sight of a crawling bee, according to text book teaching, or from "experts" who have given up practising beekeeping for a long time or who have neither the time nor the facilities for extensive observations that would permit them to fully appreciate the significance of mortalities amongst bees or the fact that old foragers of good strains may persist in returning to their hives exhausted and dying, specially under abnormal stimuli, as in the case of a weakened colony.

(2) The 1920 season has been an exceptionally bad one, resulting in irregular ovipositing, shortage of food, and repeated hindrances to cleansing flights, with the inevitable result of a higher percentage of old bees than usual amongst the hive population and the manifestations of signs of malnutrition and old age.

(3) A colony under such adverse conditions may rapidly dwindle without showing many crawlers in front of the hive; yet it would not be correct to consider such a strain of bees more vigorous than that of a colony whose foragers, though exhausted, fight hard to reach their home.

(4) We conclude, therefore, both from reports as well as from our own observations, that the symptoms described and complained of by many novices are the natural outcome of a *disturbed hive equilibrium*, in which judicious feeding and management would prevent a big disappointment. But so long as the average beekeeper is trained as an imperfect machine instead of a thinking and a practising observer, this disappointment is to be expected.

LATE-QUEEN INTRODUCTION. It is futile to re-queen a colony suspected of disease at the close of the season, when it is impossible before the advent of winter to replace the old bees by those of her progeny.

On the other hand, some beekeepers prefer to do Spring re-queening in the autumn, as late even as October. But as it is desirable not to stop breeding at such a critical time when young bees are *decidedly needed*, the question arises as to the best method of re-queening under such conditions. Supposing you have a vicious strain of bees which you want to re-queen for that and possibly other reasons, the usual preparation for *indirect* queen introduction *must* be observed. With pure or even "hybrid" gentle strains, the following method will work well:—

On the receipt of the queen, waxen the paper on the candy hole of the travelling cage, if not already done, and immediately place the cage on its side under the quilt, leaving it in that position for four days. Then towards the evening open the hive, remove the old queen, and give by way of stimulative feeding (and also for diverting the attention of the bees), a cake of candy. The paper on the candy hole should now be removed and a good opening drilled in the centre of the candy to facilitate the quick release of the queen, within a couple of hours. The cage is now returned to the hive and placed in the rear in an easily accessible position, so that it may be removed without any further disturbance to the bees.

The *disadvantage* of late autumn re-queening is limited to disturbing the bees by opening the hive. But according to the usually successful procedure above described, this is limited to one operation, as it is rarely a failure. The *advantages* are those of avoiding a spring disturbance of the bees, especially in a fruit district, and of securing the strain of bees required from the very beginning of the following season.

CANDY FEEDING. This is again a topical question. The beekeeper who unexpectedly discovered the shortage of food in the hive larder had of course no option for some time but to supply candy, if he had no reserve of standard combs of stores. He is the wiser in late spring districts by giving them this emergency food without further delay, as it has to be dissolved, digested and stored before it will be consumed in quantity by the bees.

THE METAL COMB IN JAPAN. Writing to the *Canadian Horticulturist and Beekeeper* for September, our esteemed collaborator, Mr. Yasuo Hiratsuka, after giving his favourable experience with the

Macdonald Comb, sums up as follows: "I believe the aluminium comb ought to be used for our brood chambers in honey production at least, although it is rather expensive. Not only does it solve the storage problem, preventing wax-moth damage and the control of bee diseases, but it is a safeguard against too many drones—decreasing drone breeding, as you see. But I wonder when the aluminium comb is used for brood-rearing for many years if its cells will become too narrow, because the larvae cocoons remain and accumulate as in wax comb. What shall I do for it. How can I clean it away?"

The research work conducted in this country has been quite fruitful in solving this and other difficulties by the elaboration of an original improved metal comb which is in the hands of Messrs. Adminson, Ltd., as also more than one type of metal foundation, and it is merely a question of raising sufficient capital for further advancing the cause of scientific bee culture, by the development of a more progressive artificial comb or comb-foundation.

THE ETHICS OF BEEKEEPING.

A timely contribution from the pen of the Rev. W. Henry Richardson which appears in this issue of the BEE WORLD will serve, we trust, to foster the spirit of comradeship, both nationally and internationally, amongst members of the beekeeping industry, and to stimulate the finer qualities of human association which are the real basis of culture and progress.

Although we have opened our door and extended a hearty welcome in a spirit of brotherhood to all who wished to co-operate in a forward movement and have not hesitated to find room at the front for those who were formerly in the rear, and have done our best to encourage all workers, we have equally not lost sight of the failures of human nature, and we appreciate this acknowledgment from the Rev. Richardson. We do not deny that we published a critical letter which was considered by several readers at the time as being out of harmony with the spirit of tho BEE WORLD and also inaccurate, but we had a strong reason for doing so, namely, the wrong grievance under which the critic was labouring, and in his turn the criticised contributor has now an opportunity for a reply.

It is rightly said: "Competition is the life of trade until it becomes destructive—then it is the death of trade." It is an open secret that this is one of the root evils which are undermining the best interests of British beekeeping. There are over forty thousand beekeepers in the United Kingdom who are left disorganised and partly divided into camps with hymns of hate to guide them, thanks to the trade canvassers and opportunists who are infesting the industry. This is why we consider it our duty not to tolerate unjustified attacks on beekeeping organisations. It is far from being our particular function, for instance, to defend the *B.B.K.A.*, which is quite capable of taking care of itself, but we quite realise that the ridiculous attacks on the Association for the mere sake of playing to the gallery and for cheap self-advertising, which is the fashion of the day amongst the pretenders, is an attack on the whole movement of unionism. We have no respect for personalities, but much for principles. It matters very little to us if the whole Council of the *B.B.K.A.* or the *Apis Club* or any other organisation is sacked provided a *better* Council is substituted, but it is quite a different thing to launch vague attacks secretly or openly on the work of one society or the other by people who will contribute neither in labour nor money and who vote, hypocritically enough, for those whom they criticise, and dare not challenge them when the election time comes. They are very anxious not to discriminate between the officials of a society and the whole society as a body; and in criticising the former, principally exert their utmost energy in mainly suggesting that such a society is useless. Has this practice any significance other than attempting to break up organisations created by strenuous labour for the sake of creating personal cliques and leaving the industry at the mercy of selfish intriguers?

We have always understood that we have a free pen under all conditions. An editor who does not enjoy this liberty is not worth his salt. Neither donations to the paper (which would never have been accepted if doubt as to the sincerity of motive has ever existed) nor any other service should ever place our policy at the service of personalities. Those who have attempted to exercise such an influence, directly or indirectly, have simply to receive the right punishment, whether they happen to be in the front or the rear, and we strongly repudiate any association with, or responsibility for, those few opportunists who utilised their membership in the *Apis Club* as a means for unworthy and unmerited egotism at the expense of others to an extent of notoriety. No person of real ability and knowledge would sneer and insult, instead of helping and educating. The proverb truly says: "Knowledge humbleth the great man, astonishes the common man, and puffeth up the little man," but *the worst of all pitiful manifestations of vanity is displayed by the little man with the little knowledge.* The lesson will not change our faith in the final triumph of character and honesty, but will not be forgotten.

ACARINE DISEASE.

A remarkable addition to our knowledge of bee diseases was contributed in a series of illustrated papers read before the *Royal Society of Edinburgh* on November 1st, 1920, by Dr. John Rennie, Chief of the Laboratory of Parasitology and Experimental Zoology in the University of Aberdeen, and his research assistants, Miss E. J. Harvey and Mr. Bruce White. Their investigation of the cause of the so-called "Isle of Wight" Bee Disease led to the discovery of a very diminutive mite (*Acarus*) belonging to the genus Tarsonemus, in the first pair of spiracles. It was first observed by Miss Harvey more than a year ago, but its persistent presence in cases of malignant dysentery, and therefore its pathogenic significance, was noted first by Mr. Bruce White. To Dr. Rennie, under whose guidance the whole research was conducted, belonged the credit of parasitological study and classification apart from important suggestive direction.

Over 3,000 specimens of bees from 250 stocks from different parts of the country were microscopically examined with thoroughness and care during many months, before the considered verdict of the investigators was announced to the scientific world and to beekeepers.

The Editor of this magazine was hindered from responding to an invitation to the Edinburgh meeting, but had an opportunity of attending a meeting of beekeepers held at the Horticultural Section of the Ministry of Agriculture on December 8th, which was addressed by Dr. Rennie on the subject matter of *Acarine Disease* and the Aberdeen discovery. This justifies a few comments at the present juncture, leaving detailed examination of the work done till after a study of its full report.

Let us acknowledge at once a debt of gratitude to the unselfish pioneer who has rendered by his financial subsidy the successful conduct of the Aberdeen research possible. It was due to the generous donation of Mr. A. H. E. Wood, of Glassel, Chairman of the *Aberdeenshire and Kincardineshire B.K.A.*, and to equal grants from the Development Commissioners, the University of Aberdeen, and the North of Scotland Agricultural College, that the financial difficulty was overcome. Most generous as it is, Mr. Wood's contribution of £500 per annum for five years could easily have been jointly advanced by several of our wealthy apologists, had they the best interests of apiculture at heart; or by the beekeeping societies of the country and business establishments, had they not been trained by the slumberers to believe that scientific research belongs to the State and the State alone! By a very small levy on their members they could easily have provided the necessary fund, when no difficulty stands in the way of financing party quarrels. . .

Another lesson to be emphasised—and it is a very important lesson to those who do not sufficiently grasp it—is the fallibility of human work, whatever competent hands do it, since it is obvious that lack of sufficient open-mindedness and acute observation has obscured the detection of the *mite* under consideration in the past. Many investigators with big handles to their names have searched the microscopical field and must have seen these *Acari*, but obviously failed to grasp their organic feature owing, perhaps, to their minuteness. To the alertness and keen power of detection of the discoverer of *Tarsonemus Woodi* (so called in recognition of Mr. Wood's encouragement) a sincere compliment is due, and equally to Dr. Rennie for appreciating its unprecedented classification

Dr. John Rennie.

A. H. E. Wood, Esq.

Miss E. J. Harvery.

Bruce White, Esq.

and this hitherto unknown type of parasitism. True, larger hive mites have been previously met with on exceptional occasions in the respiratory system of the bee, apart from the hive itself, but the distinction of the organism and disease in this case is obvious.

In a letter to *Nature* quoted elsewhere, Dr. James M. McQueen suggested that *Tarsonemus Woodi* could have been discovered much earlier had Dr. Rennie followed his advice of undertaking a physiological study of metabolism in healthy bees and in bees known to be suffering from symptoms of I.W.D., making use of oxygen and carbon dioxide determinations. We must confess that we fail to understand how can abnormal oxygen and carbon dioxide determinations indicate other than an abnormal breathing and not necessarily a primary disease of the respiratory system. For instance, in *Nosema Disease*, the dilated intestinal tract exerts pressure on the abdominal part of the tracheal system, which is there most developed, with consequent marked disturbance to breathing. So, therefore, Dr. McQueen's suggestion does not really provide, in our humble opinion, a key to the solution achieved. *Comparative histological study alone has achieved it.* The importance of this guiding research factor in such a disease as the one under consideration was referred to in the BEE WORLD for October, 1919, and commented on by Gilbert Barratt in a subsequent number (Vol. I., p. 198). Much energy was wasted in the past on bacteriological research and cultures, to the detriment of pathological study with the aid of histological examination of healthy bees used as controls.

Samples of imported bees examined at the University of Aberdeen did *not* show the presence of *Tarsonemus Woodi.* This evidence, however, does not necessarily mean that the disease is limited to this country, as more extensive examination, in our opinion, is required before making such a sweeping conclusion.

It is emphasised by Dr. Rennie and his collaborators that the rule with *Acarine Disease* is malignancy. This we can well understand. The causative *mite* has a preference to the first pair of tracheal tubes ending in the first pair of spiracles. Students of the bee anatomy must know that the bases of the wings derive their air supply from the thorax tracheal tubes, and when one-fifth, and a very important part at that, of the openings of the bee's lung system is deranged, little wonder that flight is hampered and metabolism in general suffers. Added to this, *texaemia* from the metabolic products of the *mite* must exercise its effects. It seems to us that the latter factor, of which no mention has been previously made, is more harmful than the derangement of the tubes themselves.

Granting malignancy in single infected bees, it does not follow that the whole colony will in time be extinguished, or that the disease cannot be *arrested* at the close of the season by artificially swarming a colony, and trapping and destroying the old bees and by encouraging breeding, since young bees are acknowledged to have some resistance to infection. With a fluctuating population, the prospective course of the disease cannot be definitely judged without due consideration to the race and quality of bees and to beekeeping and *environmental conditions*, the significance of which is too often underestimated, whereas in our opinion and experience such conditions are of *extreme importance* in shaping the practical health or sickness of bees. We see no reason why in resistant bees *wandering Acari* may not be occasionally met with in the tracheal tubes only to leave them in the end, or that breeding may be arrested in some cases of hardy bees. This is a wide field for research which has not yet been surveyed, so far as we know. But to any student of parasitology and pathology there is no mistake about much if not all of the significance of the Aberdeen discovery.

Pseudo-scientists and prejudiced critics are anxious to consider the presence of *Tarsonemus Woodi* in the respiratory system of the bee (despite the significant pathological features accompanying its presence) as an effect and not a cause! It will suffice to mention this suggestion to show its absurdity Unfortunately this and similar suggestions are put forward by propagandists who are more afraid of legislation for bee diseases than of the maintenance of ignorance. Others ask, is this *mite* the only cause of I.W.D.? Needless to say, it is not correct to mix up predisposing conditions with the actual cause of a disease. But in the light of the growing state of our knowledge what good purpose is likely to be served by such dogmatism? The term I.W.D. has now become *entirely out of date*, and we do not propose to use it in future. If the bees show symptoms of disease which is neither N.D. nor A.D., though bearing resemblance to them, let us hear about it under some other name, or let us know it by a chief sign. But to keep dwelling on I.W.D. does not serve the cause of science.

Without considering the comparative degrees of virulence, there are good reasons for stating that we know now definitely the existence of the following *adult bee diseases* of microbic origin:—

(1) *Microsporidiosis* (Graham Smith, Zander, and others) or *Nosema disease* (White), caused by the protozoon *Nosema Apis*.
(2) *Acarine Disease* (Bruce White, Harvey and Rennie), caused by the mite *Tarsonemus Woodi*.
(3) *Paralysis* (Goodrich), due to dust mould.
(4) *Simple Dysentery* (Goodrich and others), due to a small oval yeast.

There are also reasons for suspecting that disabilities and mortalities of adult bees confined to one or more colonies in the same apiary or district or otherwise, and dependent on prevalent wrong methods of beekeeping, may be associated with:—

(1) *Avitaminosis.*
(2) *Senescence.*
(3) *Dietetic or Metabolic poisoning.*

It seems, therefore, totally misleading to maintain much longer the dogmatic expression, "Isle of Wight" disease, when a virulent form of one of these diseases or the other may merit the old dreaded name. Quite recently a case of *dietetic poisoning* of no less than ten colonies in the same apiary through brown sugar candy was brought to our notice. The symptoms, in the absence of microscopical examination and data, might easily have been mistaken for those of *Nosema* or *Acarine disease*. Let us, therefore, improve our knowledge by greater accuracy in description and diagnosis, and leave the unhelpful dogmatism to past seasons. . .

THE FERTILISATION OF DRONE EGGS.

The 1920 season in Great Britain will be memorable as an exceptionally bad season, which is considered by veterans as the worst ever known for the last 50 or more years. Almost every beekeeper in the country was more concerned with warding off starvation than any other enterprise. Consequently, the interest of research seriously suffered. Though not surprised at this, we must confess our disappointment at the inadequate critical comments advanced on the brilliant contributions of Miss Betts, for instance, and the apathy shown by commercial bee men towards the research work of Gilbert Barratt in relation to the fertilisation of drone eggs.

We sincerely trust that the 1921 season will redeem our hopes. As a little reward for meritorious work, we are offering a prize of three guineas for the best research on the successful fertilisation of drone eggs with a view to the commercial application of such results. Other conditions of this research competition are:—

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(1) It is limited to members of the *Apis Club*.
(2) At least two other members must join as witnesses (or collaborators) to the practical work of the competitor, and submit a declaration to that effect.
(3) The competition will close on September 30th, 1921, and all reports received after that date will not be qualified for this competition.
(4) The researcher or researchers must conduct an investigation and record his or their views on:—
   (a) Mr. Barratt's technique and work recorded in an article to the BEE WORLD for December, 1919, which is reprinted below.
   (b) Any improvement on Barratt's technique.
   (c) The causes of failure and how to avoid them.
   (d) A detailed comparison between the progeny of a queen bee raised from an artificially fertilised drone egg and those of a queen of a similar strain reared otherwise, both colonies from the start of comparative observation being kept under approximately identical conditions.
(5) Three illustrations and a report in not more than 1,600 words, or about two pages of the BEE WORLD, must be submitted. The illustrations should be fit for reproduction, and may be either photographs or line drawings. The report and illustrations which win the prize remain our copyright.
(6) The decision of the Editor on awarding the prize, and on all matters concerned with this competition, must be taken as final and legally binding, and no correspondence can be entered into with regard to it, and no

return of reports or illustrations submitted is to be expected.

(7) Any competitor who does not comply exactly with these conditions will be disqualified.

The subject matter of this competition is really not difficult to any competent beekeeper who commands the necessary time and aptitude, and we earnestly hope that members of the *Club* who are in a position to conduct the work will compete.

Mr. Barratt's article, referred to above, which appeared under the title, "Research Work in Queen Rearing," was as follows:—

"Recent research work, consisting of experiments in drone egg fertilisation, may be of interest to some readers of the BEE WORLD, considering that they disprove the theory advanced by Simmins and Dieckel, that all eggs are fertilised, and that drone eggs are defertilised by the workers.* These experiments afford, therefore, a final confirmation of the theory of parthenogenesis.

"The almost unique nature of the bee's egg lies in the fact that the fertilising element from the drone enters from the outside of the egg, after it is fully formed, and immediately prior to its extrusion by the queen. This makes the artificial fertilisation possible, and without the aid of elaborate and costly appliances.

"The writer would here mark his deep appreciation of the work of the great Cheshire, the study of whose wonderful labours made these experiments possible.†

"In speaking of worker eggs, the popular term will be adhered to, and whilst most bee books speak of the marvellous manner in which the workers can raise a queen from a worker egg, the reverse is actually the case, and the miracle performed thousands of times oftener, since the queen is bound to reproduce herself each time she lays a fertile egg, and the rearing of workers from *queen* eggs the more wonderful occurrence. In the experiments here recorded, freshly laid drone eggs from a pure golden queen were secured, by placing a frame of clean drone comb in the centre of a strong stock, and here it may be stated that the use of eggs two or three days old will always result in failure. The comb containing these eggs was cut down, and pure Punic drones, just arriving in the hive from a flight, were squeezed on to a warmed glass plate. The necessity of using drones on a return from flight is shown in Cheshire's beautiful description, when the air sac being fully distended, the expulsion of the male sperm on to the glass plate is rendered a readier and more certain operation. This squeezing of the drone demands some practice before the spermataphore can be ejected. It is necessary that all these operations be conducted at a high temperature, from 95 deg. Fahr., seeing that natural fertilising occurs at the internal termperature of the queen's body, and whilst the male sperm is possessed of a high energetic vitality, the homologous element in the egg requiring little muscular effort, will not be so full of energy, and therefore more easily chilled, which would result in the imperfect coalescence of the two germs or not at all. Imperfect coalescence would probably result in the production of hermaphrodite bees, a freak which must have been noticed by most observant apiarists. Hewitt mentions a queen he possessed, furnished with corbiculæ, and instances of workers with drone heads, workers with drone legs, and drones with stings are recorded by Cheshire.

"The next operation was to touch the large ends of the eggs with a camel hair pencil, previously dipped in the sperm from the glass plate. An eyeglass as used by watchmakers is a most useful article in this, and many other operations in the apiary, notably in the transferring of larvæ in queen rearing. The eggs were next placed in an incubating chamber, maintained at 97 deg. Fahr., a small poultry incubator answering the purpose very well; the next day, a little royal jelly, slightly thinned with new honey was added with the hair pencil, again on the third day, and on hatching were further fed with royal jelly for two days. The transfer to artificial queen cups, in the manner familiar to all queen breeders, was then effected, these being given to a queenless and broodless stock of bees. They were duly accepted, capped over, and resulted in perfect queens, proving that the male spermatazoon had entered the micropylar aperture of the egg, and produced fertilisation.

"Punic drones were used in the foregoing investigations, because, as the Punic is intensely black, and possesses other characteristics, the greater contrast would be provided.

"If a pure queen, mis-mated, is used for drone eggs, and the sperm from a pure drone of the same breed, the resultant queens will be pure, seeing that the drone mated to the mother has no influence on her drone eggs.

"To give an example, the writer possesses queens imported from U.S.A., bred from a Dr. Miller mother, but, as these queens were mated in Mississippi, the strain of the drones was not known. By using drone eggs from one of these queens (which will be pure Miller), and drone sperm from any drone selected, the pedigree of virgin queens produced will be established; similarly, if drone sperm from another first cross Miller is used, a pure bred Miller will result, although at the risk of inbreeding. The eggs of a drone laying virgin may be treated in exactly the same manner, and perfect queens will result.

"The value of these investigations will be apparent as it is seen that in breeding a strain of bees, any particular blood can be definitely introduced, a thing almost impossible previously, seeing that although we may know that a queen has mated to, say, an Italian drone, we are not sure to what particular strain. It will be readily seen that in queen rearing, uncontrolled mating is cut down by exactly one-half, as the drone egg of any given queen can be mated to any drone, and only fails in the final mating of the queens produced for the production of worker eggs in quantity

"In earlier experiments, the drones were squeezed directly on to the eggs; the results were not always certain, owing to the large amount of extraneous matter.

"It is to be hoped that queen breeders in Britain and those interested in research work will give this method an extended trial, also further investigate, using the eggs of fertile workers, and publish the results of their experiments."

BEE DISEASES LEGISLATION IN GREAT BRITAIN.

The Bee Diseases Bill,† critically discussed before in our columns, both editorially and otherwise, was introduced by the Lord Lee of Fareham, late Minister of Agriculture and Fisheries, in the House of Lords last December, and passed its first reading. At any time it may appear in the House of Commons, once the Government's worry over the financial position of the country (which has put almost everything else in the shade) has abated.

We have pleasure in giving due credit to the M. O. A. for taking into consideration all critical observations made in the bee Press; and in contrast to previous haste, have done their best to win the goodwill of the Craft which is widely recognised as most essential for making a success of Legislation. It is said that the principle of Legislation is endorsed by almost every beekeeper in Great Britain, but that there is an appreciable opposition to the present Bee Diseases Bill as it stands. Although this important question will receive adequate attention from us in future numbers, it is not premature to submit a general brief survey, both retrospective and prospective.

(1) *The Need for Legislation.*—To the ravages of adult bee diseases in Great Britain (to say nothing of the endemic brood diseases which annually claim a heavy death roll), especially during the last ten years, combined with the absence of satisfactory remedial measures is due the growing interest in preventive or rather controlling procedures, and consequently the study of beekeeping conditions in other progressive countries, where Legislation is in operation. The consensus of opinion is that Legislation has been helpful to these countries, and therefore is worthy of adoption here. That, in spite of its operation in other countries, diseases are not extinguished, is only logical.

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* We need hardly say that this theory is utterly incompatible with the observations of any microscopist who is familiar with the embryology of the bee.—ED.

† Cheshire's "Scientific Bee-Keeping."

† H. L. 253, 1920. Obtainable from *H. M. Stationery Office* at the following addresses: Imperial House, Kingsway, London, W.C 2, and 28, Abingdon-street, London, S.W. 1; 37, Peter street, Manchester; 1, St. Andrew's crescent, Cardiff; 23, Forth Street, Edinburgh; or from E. Ponsonby, Ltd., 116 Grafton street, Dublin. Price: 1d. or 2d., post free.

and obviously does not mean that in its absence greater control of bee diseases can be achieved. That journalists and former inspectors in the U.S.A., for instance, are laying stress on the value of educational persuasion instead of the big stick only speaks for the best form which the application of State Control should take in the majority of instances, but we fail to see that it means in the least abandoning State supervision. In fact, in the absence of such supervision, it would be impossible to forestall or check a threatening epidemic.

The attention that has been given within recent years to selective breeding in Great Britain has undoubtedly done a good service to beekeepers. Yet there is no doubt also that it has been partly neutralised and greater expansion discouraged by the careless section of beekeepers who are not prepared to accept a joint minimum of sacrifice in order to maintain an apiarian standard of health. When the Ministry of Agriculture finally introduced their restocking scheme and infused our apiaries with a live antiseptic in the shape of Italian and Dutch blood, they were morally bound to ascertain the powers of the new agent. Having found it mildly strong, but not over-powering, it was their clear duty not to leave their constructive work unguarded, otherwise they would simply be destroying by their indifference in one direction what they are building with enthusiasm in another. The Government cannot, therefore, be blamed for their worry over the question of Legislation, after doing their best to explore the "immunity" side of prevention.

(2) *The* 1920 *Official Conference.*—The Conference officially convened in February, 1920, to examine this question, although we maintain could hardly have been described as fully representative or that the proceedings of which were admirably conducted, is certainly more representative of the Craft than other gatherings of beekeepers that have taken place since then behind our backs. In a spirit of charity we will endeavour to avoid their critical examination. Such gatherings have put all criticism about the Ministry's Conference entirely in the shade, and therefore the less said about them the better. From a study of the proceedings of the former Conference (BEE WORLD, Vol. I., p. 212), there is no doubt that the great majority of the members were in favour of the current Bee Diseases Bill, criticism being limited to a small opposing section.

We need no assurance that the Government could easily have pushed the Bill through Parliament, and it certainly speaks for the tolerance and wisdom of the Ministry of Agriculture to have refrained from exercising their powers to the extent of a precipitate introduction of Legislation, and doing instead their best to win the goodwill and co-operation of the Craft.

Undoubtedly the main credit for stimulating the Ministry of Agriculture regarding the introduction of Legislation, which now seems inevitable, will belong to the *B.B.K.A.* The Association widely distributed appeals for Legislation, which were signed by many beekeepers, and have given the current Bill their moral support. Whatever amendments or fresh details of procedure are going to be introduced, the Association still have a big claim to the main credit. It is surprising, therefore, that at this stage no educational literature by the *B.B.K.A.* has been compiled and distributed amongst the rank and file of beekeepers and Members of Parliament. Our surprise is shared by many others, as it is inconceivable that such an important point has been ignored, and it is earnestly hoped, therefore, that the publication of such instructive literature will not be much delayed.

It is a painful fact that some beekeepers who signed that unconditional appeal (which we personally did *not* share in endorsing) and induced others to do so were amongst the first to denounce a measure which they *were bound in honour* to support, considering that it was sanctioned by the Association's Council. The reason is obvious when it is remembered that a certain section of the opposition announced that the "biggest" fishermen were against it. The bait proved only too inviting to the little fish, which, though still swimming within the fishermen's net, imagine that they are free and important creatures! Such a curious mentality presents unsavoury irresponsibilities that are hardly fit for discussion. . .

(3) *The Application of Legislation.*—We certainly support, as we have always done, the principle of Legislation for defined infectious bee diseases, and consider that in its absence the restocking activities of the Ministry of Agriculture are at least partly nullified, as previously remarked. It would be superfluous to recapitulate our reasons given in earlier numbers of the B.W. which led us to consider the present Bill of *very wide powers.* Yet we have not been working for wrecking the Bill as others are doing under a disguise, but for amending it, or introducing adequate safeguards. Equally we have never been known to have either the time or the inclination to take part in those peculiar secret gatherings, the proceedings of which are based on personalities.

We would draw the attention of our readers to all that has been said previously in the B.W. both for and against Legislation, and the policy of the M.O.A. Let them examine these points carefully, and learn that the Ministry have decided to set up a *Bee Advisory Committee* representative of every section of the bee-keeping industry for advising the Ministry on this matter. The constitution of the *Committee* will be as follows: 2 representatives of the *Apis Club* (and its affiliated societies), 2 representatives of the *B.B.K.A.* (and its affiliated societies), 2 representatives of the beekeeping interests in Scotland, 2 representatives of the beekeeping interests in Wales, 2 representatives of the bee appliance manufacturers, 2 representatives of the large apiarists, 2 representatives of the scientists engaged on bee research work, and 2 beekeepers nominated by the Ministry. The Ministry still maintain that for legal and administrative reasons the elastic Bill proposed, based on the "Order" system, cannot be bettered, and declare that they are quite prepared to submit the Bill for the further consideration of the Craft, through the *Bee Advisory Committee* now in the course of formation, which Committee will always be consulted in all matters affecting the application of Legislation. In the light of this new position, which exceeds our most sanguine hopes, we leave to our readers to judge whether fresh obstructions by those who profess to uphold Legislation in principle are justified or otherwise; also whether the attempts to misrepresent and abuse the promoters of Legislation, to the delight of members of the gallery and the commercial adventurers, are likely to be productive of any good to any worthy cause.

(4) *The Opposition to Legislation.*—There are certainly some sincere opponents to Legislation, people who believe entirely in voluntary educational efforts, backed, perhaps, by Government grants. So far as we are concerned, we shall certainly *never* uphold any Legislation for bee diseases which in practice is not fundamentally educational, which can punish but cannot teach, and which does not heed scientific research. They calculate that a scheme based on their views would, on the one hand, encourage beekeeping, and on the other, would foster education which, after all, is the essential factor in success, and yet without incurring big expenses as feared would be the case under the coming Bee Diseases Act. The more one examines these views the more one is bound to feel that unless some official authorisation is given to any such scheme it is bound to fail through the familiar obstructions of the selfish, who are bound to work against the common good. However, the views of this section of the opposition (who, in a measure, are alone qualified to that title) are bound to meet with the respect and consideration of the Government and the *Bee Advisory Committee.* It is quite possible that when their apprehensions appear to them unjustified their co-operation would be forthcoming.

Another section of the "opposition," and that description in reality does not apply to them, sincerely believe in Legislation, but, like ourselves, fear the wide powers of the 1920 Bill in the absence of adequate safeguards. Assure them on tangible grounds that the *Bee Advisory Committee* will not be a sham, and that there is no question of rushing with measures or taking decisions or actions without the co-operation of the Craft, and their goodwill is assured.

As to the noisy clique and pretenders who preach what they *never* practise, who endeavour to play on the susceptibilities of the average beekeeper (whose interests they have traditionally ignored, and yet have the audacity to claim his defence and protection), and whose methods of propaganda are entirely devoid of accuracy and a sporting spirit, well . . . there is no doubt left that the sooner they are completely ignored and treated as outcasts the better. We have already had enough of their displays and camouflaged advertisements.

In fact, they would never have thrived without the unmerited courtesy extended to them by one bee journal or the other. They have been taken at their word, and have already shown their worthlessness. A page of the B.W. is ample space for breaking up their arguments, but they will never get tired of inventing new ones and also fresh accusations. This is a renewed fight between Progress and reaction, and we have no doubt as to which side shall ultimately win.

A TESTIMONY TO THE DUTCH BEE.

The Rev. E. F. Hemming, whose *Jottings from Huntingdonshire* in the *B.B.J.* are always a pleasure to read, gives the Dutch Bee the following unprejudiced testimony: " . . . . Find yourself at a bee meeting and be sure the Dutch bees will be called many uncomplimentary names. The best that seems to be said of them is they are excellent for re-stocking, but useless as a source of profit. 'Do nothing but swarm'; 'Kill every Italian queen introduced'; 'Work for themselves and not for their master' are some of the remarks one hears. Yet, judiciously handled, the Dutch bee is the most furious worker of them all. Where is the person who won't agree that Dutch bees will, for instance, fill up ten frames in a brood nest in less time than any other race of bees? Are they not, too, past mistresses in wax-secreting and building? Always swarming, are they? That's been bred in them. Reared in skeps, and not high ones at that, what else could such prolific insects do but swarm? Superings no good, isn't it? I beg to differ. Give Dutch bees room, room, room, all on the same floor level, and if they swarm it won't be before they have left 30 or 40 lbs of surplus honey behind them. A swarm of Dutch bees in August will do more than a July swarm of any other breed. Where is a queen other than Dutch that will fill up nine or ten frames of brood within a week of October? I love my Italians and their golden bands, their pranks, aye, and their temper; yet I shouldn't like to be without at least one stock of Dutch. They would be worth keeping, if only to watch them going from and returning to the hive. Following one another, almost as closely as one word follows another in print, it is a fascination and a delight. My advice, therefore, to those about to purchase a Dutch stock is 'Do.' You won't regret it, if you let them have plenty of work to do. Half sheets of foundation, quarter sheets in the supers, and they'll be happy. Extend your hive lengthways if you can, or get one made to take about twenty-five frames placed parallel to the entrance—the queen excluder, suspended between the tenth and eleventh frame, and await the results. As a comb is filled with honey take it out and extract and return or put in another empty one, and if you get more than one swarm in a season under these conditions from each hive I should like to hear of it. I had better say here that I am not connected with exporters of Dutch bees and have no axe to grind."

We do not agree with the suggestion of using half sheets of foundation in the brood chamber or with limiting the usefulness of the Dutch bee to long hives. The *Incubating or Brood-Hatching Chamber*, of which hundreds are already in use both in Great Britain and abroad since its introduction in 1918, has certainly succeeded in making the Dutch and other prolific breeders pay. The following description of the appliance and its chief uses may answer the purpose of enquirers. The description refers to a B.H.C. for a hive of the W.B.C. pattern, but needless to say the principle can be adapted to any hive. Any of our readers who is handy with tools can make it for himself at a small cost.

The *brood-hatching chamber* consists of an outer casing similar to that of the brood chamber proper of an ordinary W.B.C., or similar hive, and of an inner box of practically equal outside dimensions to an ordinary 10-frame stock box, but differently constructed. We are principally dealing with this *brood-hatching box*. It consists of three compartments, which are separated from one another by wooden partitions, and yet allowed to intercommunicate when desired by means of holes fitted with zinc shutters in the partition walls. The bases of the side compartments are fitted with queen excluding material, whereas that of the central compartment is fitted with ordinary perforated zinc, furnished with two bee-escapes (which may be fitted, instead, to the side partitions), also with a hole possessing a zinc shutter (the hole is intended for the purpose of communication, when required, with the brood chamber proper). The central compartment has, in addition, a frame cover of perforated zinc.

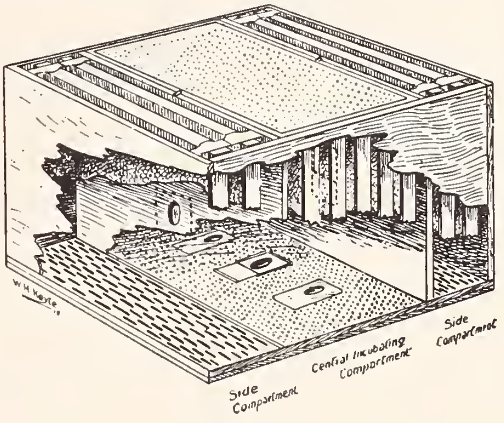

Fig. 16.

The *uses* of this chamber are multiple, and it is capable of performing more than one function at one and the same time.

(1) For *intensive brood-rearing.*—The population of the hive could be appreciably increased by utilising the central compartment for incubating the capped brood. It will accommodate a maximum of 5 combs of capped brood removed from the brood chamber, after shaking off most of the covering bees, and with due regard to the queen, which should be left in the brood chamber proper. Frames with full sheets of foundation, or preferably complete combs, should take the place of those moved above. After a period of not less than ten days the hive is reopened and the operation repeated; in this case the frames in the central compartment with any covering bees, which have not passed down through the escapes, are returned to the brood chamber, and five more frames of capped brood are moved upwards in their place. If this maximum number of combs cannot be secured there is no difficulty in incubating a smaller number. In this manner the nursing bees are relieved of the unnecessary duty of incubating the capped brood, and the would-be wasted natural warmth of the hive is made use of for this purpose. The strength of the colony will thus be appreciably augmented. This is of great importance to the beekeeper, whether he is specially interested in bee-rearing or honey harvesting, since the latter also depends, amongst other factors, on the force of the foraging bees, which is maintained or increased in a controllable manner by means of this chamber. The exercise of this function does not necessitate opening the hive more than 3 times in a month. To insure the success of these operations, do not use the chamber either too early or too late in the season, since everything depends on conserving the ascending warmth from the brood chamber proper by means of careful packing and correct use.

(2) For *securing good winter stores.*—It should be the duty of every progressive apiarist to secure the winter food of his bees before claiming any surplus as his own. There is no food in existence for bees which compares with good honey, their natural diet. Their stamina is bound to be lowered by feeding them on artificial food, and thus becoming predisposed to disease. The side compartments perform the function of a super, each accommodating two standard frames, and will help you to secure the winter food of your bees early in the year. Should you desire at any time to stop the use of the central compartment for brood incubation, and prefer to utilise it as an *additional super*, you merely need to let it intercommunicate with the side compartments. The use of the *brood-hatching chamber* does not prevent you from additional supering, and whenever you desire *super-clearing* you have simply to place a sheet of perforated zinc at the bottom of each of the side compartments and allow intercommunication with the central compartment.

(3) For the *safe direct introduction of queens.*—There is some risk with every orthodox method of queen introduction in

the hands of the average bee-keeper. There is *no* risk involved in utilising the central compartment for this purpose. The queen will be in a friendly atmosphere, surrounded by young and hatching bees, with stores at her disposal, and with sufficient room for the exerciso of her function, until she is conveyed to the brood chamber proper when the hive is next opened. Should the queenless colony lack combs of emerging brood, these should be obtained from another hive and placed in the central compartment before the introduction of the queen.

(4) For *discouraging swarming*—It might be helpful in discouraging swarming to imprison the queen during the critical period in the central compartment of the *brood-hatching chamber* on frames of capped brood. She will be safe and more or less in touch with the rest of the colony; and as regards ovipositing, she will not likely be idle. The hatching bees will attend to the eggs and larvae. Queen cells raised under the impulse of independence in the brood chamber proper may pay for your trouble, and the foraging activity of the bees will not be much reduced.

(5) For *the formation of nuclei.*—Young bees are generally considered *ideal* for the formation of nuclei. The central compartment of the chamber will serve the purpose of temporarily housing the nucleus during its creation (the openings of the bee escapes in this case have to be plugged with cotton wool, corks, or the like). Later on, the nucleus could be transferred to an independent hive.

(6) As *a queen nursery.*—Queen cells pinned to frames of honey and pollen and properly caged, could be incubated in the central compartment. So long as the would-be hatching queens are caged in the neighbourhood of both kinds of food, and so long as the date of hatching is correctly calculated (in order to avoid the prolonged imprisonment of the hatching queens), it is perfectly safe to practise this method of queen cell incubation.

(7) For the *non-hindering trapping of drones.*—It is the usual practice to place a drone trap at the door of the hive. This means hindrance and inconvenience to the foraging bees. The best procedure for avoiding undesirable drones is to use worker comb (which is generally secured when built on worker foundation by *weak* or *young* colonies); next, all hatching drones that are not required should not be allowed to remain in the hive. This could be easily attained by placing a sheet of queen excluder at the base of the central compartment of the chamber, or it might be simply limited as a semi-fixture to the openings of the bee escapes. The young worker bees will be able to pass down to the brood chamber, but the drones will be trapped and left behind, and they could be collected later on when the hive is opened (for either destruction or for use elsewhere).

No diligent beekeeper will fail to find other uses for this chamber or to modify these suggestions according to his experience.

DR. MILLER'S MEMORIAL. The passing on the 4th of last September of Dr. C. C. Miller, the celebrated American and international authority on beekeeping, aroused a sincere feeling of deep regret all over the beekeeping world. It will gratify the thousands of apiarists, great and small, in all countries, who respect his living memory to learn that an influential memorial committee has already been formed under the presidency of Mr. C. P. Dadant. In the *Am. B.J.* for February, Mr. M. G. Dadant writes: "The mere mention of a campaign for a permanent memorial to Doctor Miller will enthuse many of our readers, especially the older ones who have learned to love him, and dozens of whom have been aided by his timely and kindly advice. At the suggestion of Mr. E. R. Root, the editor of the *Am. B.J.*, C. P. Dadant has been made chairman of a committee of five to formulate plans. The other members of the committee are Dr. E. F. Phillips, of Washington, D.C.; E. R. Root, of Medina, Ohio; E. G. Le Stourgeon, of San Antonio; and B. F. Kindig, of East Lansing, Mich. The end in view will be to get the maximum number of subscribers to the fund, and anything from a dime up will show a fellow's heart is in the right place. The campaign will start soon, and find its maximum point on or about June 10th, which is Dr. Miller's ninetieth anniversary."

We feel it our duty to start a Memorial Fund, the disposal of which, in accordance with its purpose, will be decided on later, depending on the extent of subscriptions until the close of the fund on June 10th, 1921. Were every one of our readers to forward no more than one shilling postal order, a very good sum would result. All donations received will be duly announced in the B.W.

The Apis Club Memorial Fund for Dr. C. C. Miller.

	£	s.	d.		£	s.	d.
The Apis Club	2	2	0	A. Z. Abushâdy ...	1	1	0
Adminson, Ltd	2	2	0				
				Total	£5	5	0

Subscriptions to the Fund should be made payable to the Apis Club either by crossed cheque, M.O., or P.O. It is open to readers both in the United Kingdom and abroad, other than readers in America, who should directly contribute to the American Fund.

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Original Contributions.

Originality is the one thing which unoriginal minds cannot feel the use of.—J. S. Mill.

Internationalism is the Nursery of Culture.

By C. P. DADANT.

Editor, "The American Bee Journal."

Author, "The Dadant System of Beekeeping," "First Lessons in Beekeeping," &c. Reviser, "The Honey Bee."

I gather that your uphill struggle comes mainly from the obstacles of chauvanists who object to an international paper. You are not the only one who finds opposition when he tries to show that other countries may have something good besides *our* own country. In spite of the fact that parthenogenesis was discovered and proclaimed by a Pole, Dzierzon; that the honey centrifugal extractor was invented by an Austro-Italian, Hruschka; that the first attempts at comb foundation were made by a German, Mehring; that some of the best discoveries in bee history were due to a Swiss, Huber; we find people who say to us: "We do not want any information in the *American Bee Journal* but *American* information."

So we have similar fights to yours. But is it to be wondered at? Don't you know that every nation has the greatest men, the best soldiers, the most glorious history? Could it be otherwise? How would it be possible for any nation to acknowledge itself only the second best? So we must put up with the opposition of those who are constantly in admiration before their own selves.

Love of country is a great thing, especially if that country is threatened with annihilation. But those are most successful who recognise the fact that their neighbours may also have ability, who are constantly on the alert for some new discovery, some new idea, and who are ready to adopt it just as soon as it proves correct. That is why I favour greatly international publications. That is why I am willing to take a little criticism from those who are too narrow to see any good in other nations.

As you know, I was not born in America, but I believe I can be called American, after 57 years of residence here. America has perhaps less of what you and the French call "chauvanism," which we call "jingoism," than any other nation, for America is made up of so many different nationalities. The result has been a habit of accepting that which proves best without asking who invented it. This is good in beekeeping, fully as much as in any other line. We want the best, no matter where it comes from.

So, I say to you: Do not lose courage; give us an international magazine. It will make its way, and perhaps in a few years it will be recognised as the leader in bee matters.

As to critics, let them criticise. We need them to keep us in the straight path. They will find fault but they will read our publications just the same.

Dr. C. C. Miller, of Marengo, Illinois, and of the World generally.

A Tribute to the Memory of the Great Leader from the pen of John Anderson, M.A., B.Sc., Lecturer on Beekeeping at the North of Scotland College of Agriculture, Aberdeen.

When it was first suggested by the Editor of the BEE WORLD that I should write an article on Dr. Miller, I felt inclined to refuse right out, on the ground that I did not possess the necessary qualifications. I had never met the Nestor of beekeepers, had never even corresponded with him, and could not be expected to know much about the grand old man of our bee world. My disabilities remain, but on second thoughts it occurred to me that even these might lend special interest to what I might write. One who had actual acquaintance with such a charming personality could not fail to develop admiration, enthusiasm and love; but it may be of interest to know how the most famous beekeeper in the world impressed one who had no contact with him, direct or indirect.

The printed word is a great power in the world, and the true aristocracy is that of books. They bridge the gulfs of time and space, and make accessible to us the wisdom of those who have long passed within the veil. So too does literature enable us to hold converse with one separated from us by many a mile of land and sea. Given the right kind of imagination it may easily be that some far distant one, who wields a facile pen, may yet be to us a far more real person than the man living next door. Miller was very real to me, and I am sure to many who never had an opportunity of seeing the man himself. But his features were very familiar to us. I have two lantern slides of him that are constantly used in my lectures. One I copied from a print, but the other came to me across the Atlantic, one of the many kindnesses I have received from the firm of Dadant—lang may their lum reek!

But it was my ambition some day to see Dr. Miller, or to write him a letter at least. Alas! I put it off too long. When a brother beekeeper went over to America in the autumn of 1919 I asked him to pay a few visits for me. To Dr. Miller, first of all, because I feared that he might not live till I could cross myself. On his return he informed me with regret that he had not been able to see Dr. Miller, who was just at that time confined to bed with the heart attack which was the first intimation that he must be careful with the oil left in the vessel. But my friend had received a letter from Mrs. Miller, informing him of the circumstances, and containing this very interesting remark: “If he had been in his usual health he would have been delighted to see you. He is always pleased to see people from Scotland, possibly because his wife is Scottish.” Apparently the Doctor was not the only member of the family who could put things nicely. And right proud are we in this bleak northern country to know that Miss Emma Wilson, the most famous lady-beekeeper in the world, was born in Scotland, and that the grandest figure in the bee world had a Scottish help-meet.

Some years ago I paid a visit to one of the oldest beekeepers in Scotland, Mr. Robert Steele, who founded the firm of Steele and Brodie, which still holds an honoured place among the houses making and selling bee appliances. He was then a “Bailie” of Nerburgh in Fife, and was supposed to have “retired.” But, bless you, a real beekeeper never can retire, and Mr. Steele had still some 40 or 50 stocks of bees. We compared notes as to our taste in bee literature, and found that both of us read *Gleanings in Bee Culture*. “And what part of it do you read first?” said the Bailie. When I admitted that I turned first of all to “Stray Straws” he rejoined very heartily, “And so do I, because I find it the nicest, the most up-to-date, the sprightliest, and most youthful contribution in that issue.” Both of us had been impressed by the youthful elasticity and alertness of mind characteristic of the young-old writer. It is sad that no more “Straws” can come out of the mill, but it is a comfort that the back numbers of *Gleanings* are very numerous.

I wonder now, whether the Doctor wrote easily, or did he pare and polish like some of our poets. Easy writing sometimes makes difficult reading, but I somehow think that writing was no trouble to him. His style is perfect, simple nervous English, his meaning fully and unmistakably conveyed, and that, too, in very few words. Some of the beauty of his language might be explained by his musical talents, or by his mastery of several languages, but more important perhaps was the fact that he was Dr. C. C. Miller, and that his ancestors had been very carefully selected. He wrote “like an angel,” because he could not help it.

Talking recently to one of the best beemasters in Britain, I discovered that Dr. Miller's modesty had impressed him most of all, especially his readiness to say, “I don't know.” We are so weary of “authorities” who know all about bees that it is quite refreshing to meet one who does not profess to know anything, especially when we are aware that he perhaps knows more about bees than any other man alive. Dr. Miller was the perfection of modesty, no one was more tolerant of the views of others, none more ready to admit that he might possibly be mistaken. He once wrote to Dr. Phillips: “When I meditate on the pile of things I don't know, it's so big that the other pile dwindles down very small indeed.” Ernest Root wanted him to call his page in *Gleanings* “Heads of Grain,” but the modesty of the man suggested “Stray Straws” as being more appropriate.

It is impossible to associate with Dr. Miller any thought of petty jealousy. No one more quickly recognised worth in others, and none was so anxious to help and encourage a younger man. Dr. Phillips has borne precious testimony to this characteristic, and we have many other examples. Once we had in Britain a very good beeman that we had not the sense to retain. He was called F. W. L. Sladen, and his contributions to bee literature and to practical beekeeping have been very valuable. His beautiful book on the Humble Bee is a treat in store for those who have not yet read it. His translation to Ottawa was immediately observed from the Miller watch-tower, and referred to somewhat as follows—I quote from memory: “The Canucks are a bit conceited because they have got Sladen up there, but they cannot keep him all to themselves—he is too big a man for that. For my part I am proud that we have such a man on this side of the Atlantic.” Wasn't that delightful? But it was hard on the old country!

Dr. Miller's relations with the scientific staff of the Government Bee Research Department were of the most friendly nature. Dr. E. F. Phillips, the head of that Department, fully realised as did Dr. Buttel-Reepen in Germany, that there was a vast amount of information acquired by practical beekeepers which had yet “scarcely entered scientific literature,” and his association with the older Doctor has done something to remedy this. They belonged to a society of mutual admiration, though they did not always quite agree. Dr. Miller, for instance, did not worry as to whether the cause of E.F.B. was *Bacillus alvei* or *Bacillus pluton*, so long as he knew how to get rid of the disease, but his method did not at first commend itself to the scientific mind. In a recent issue of *Gleanings* Dr. Phillips has the following note: “When Dr. Miller wrote his treatment of European Foul Brood, it caused some consternation among inspectors and others; later on, of course, we found that he was right.” The friendly co-operation of bee farmer and scientific student of the bee continued to the end, and Dr. Phillips' “Thumb Nail Sketches” in December *Gleanings* make delightful reading.

Many beekeepers in this country will have access to the reminiscences of Dr. Miller that have appeared in the *American Bee Journal*, and in *Gleanings in Bee Culture*. For the joy of those who have not this privilege, I shall refer shortly to one or two of the stories. Mr. A. I. Root, himself over 80 now, has a fine notice in the “Our Homes” Section of *Glean-*

DR. C. C. MILLER.
Born June 10th, 1831. Died September 4th, 1920.

ings for October. It gives vivid glimpses of both, and both are grand old men. In the account of their first meeting, over 45 years ago, we get the only description I have seen of Dr. Miller's personal appearance. "This bright, well-dressed stranger was rather short, and pretty well up in avoirdupois." Root, as always, was the keen business man, and not over anxious to spend time talking to a casual visitor, but who could resist Miller? He not only accompanied the elder Root on a bee excursion, but he so impressed the man of affairs, that he was asked to stay to supper, entertained them by singing till far into the night, and was finally put to bed with a "young college professor" whose name has not been divulged.

Dr. Miller was fond of music, composed several tunes, and had a beautiful voice. One of the hymns he sang on this first memorable visit was "Lead me to the Rock that is higher than I." When Root the Elder felt constrained to write to the other old man on July 30th last, he added a postscript asking the sage of Marengo whether he could sing yet, and whether he could sing that particular hymn. The last paragraph of Dr. Miller's reply, dated August 7th, must be given in full: "Yes, I can sing nearly as well as ever, and it would be a delight to sing to you 'The Rock that is higher than I,' only I'd have to brush up on the words. Come and see me when I get settled in the *mansions prepared for me*."

We gather from these extracts that both Miller and his friends had a presentiment that he was needed on the other side. At a "Chautaqua" held at Madison, Wisconsin, on August 16th to 20th, it occurred to Ernest Root (Root the Younger) that he would like to see Dr. Miller again, and to get some more photographs of one who could not stay here for ever. Ernest mentioned his idea to Dr. Phillips, George Demuth, and H. F. Wilson, who were delighted to be of the company. One result of the visit was the securing of some two or three dozen photographs, some of which have already been published, and the appearance of some word-pictures not less valuable than those negatives made by Ernest's camera: "We had expected to see Dr. Miller showing his age, and that the once virile face and form would be infirm with years; but we were agreeably surprised to see apparently the same man with the same vigour of body and mind that I had seen 35 years ago. He seemed to be at his very best, and the members of our party agreed that his mind was alert and keen as ever." When Ernest mentioned that his father contemplated visiting Marengo shortly, Dr. Miller's smile seemed to fade a little. Soon, however, it came back with its wonted sweetness as he said: "I should dearly love to see your father again, for he and I are about the only ones left of the old group. But tell him he must come soon, as sometimes I think I have not many days to live. If I do not see him on this side, I surely shall on the other side."

Dr. Miller was latterly so successful as a bee farmer that we are almost surprised to hear of his early struggles. His friend Root was sometimes so sorry for him that he wished he would give up trying to make a living out of honey. A few years ago the veteran was asked if he could not have made more money in some other way. Prompt came the answer: "Certainly, I know of several things in which I could have made more money. But I should have been dead long before now, and what then would have been the good of the money? As it is, I am alive, and better and happier than when I began beekeeping 56 years ago—for I have better health." He had been trained for the medical profession, but he soon discovered that he "had not health enough himself to give it to other people." He was one of many who have taken to beekeeping because of impaired health, and have surprised themselves and their doctors by living to a good old age.

Humour is one of the highest human attributes. It is rudimentary in children and in savages; in selfish people it never gets higher than the enjoyment of a laugh at some other's expense. A man does not reach the highest level till he can enjoy the joke on himself just as well as on the other fellow. Dr. Miller was always smiling—only one grave portrait is extant so far as I know—and he smiled as often at himself as at other people. His banter was entirely good-natured, and could not possibly offend even the most sensitive. And his sallies were so unexpected. Shortly after his 89th birthday he appeared again in print, and wrote at greater length than he had intended: "But you must excuse me this time," he wrote, "for I was never eighty-nine before."

Dr. Miller was a great beekeeper and a greater man, and I fear that, in this hurried and imperfect sketch, I have dwelt more on the man than on the beekeeper. But there is one thing that I would like our bee authorities to note. Dr. Miller is claimed as a "manipulative beekeeper" by those who are continually fiddling round with syrup-cans, queen-excluders, drone-traps, and such like contraptions. As a life-long producer of comb-honey he could certainly not be claimed as belonging to the class of "let-alone" beekeepers; but the longer he lived the more inclined he was to let Nature have her way. Just recently he expressed the view that one should feed as little as possible, and it would be all the better if feeding could be avoided altogether. He certainly did not agree with those who think sugar-syrup better than natural stores. It might be well for some of our younger enthusiasts, who believe in requeening every year, if they would ponder one of his "last answers," which appeared on page 388 of the November *American Bee Journal*: "I know it is commonly advised to replace a failing queen, but in my own practice I generally leave it to the bees to supersede their queen when, in *their* judgment, it should be done, and I generally find my confidence well placed."

Who shall tell all the greatness of the man? We get glimpses here and there, little touches which are revelations to those of us who were debarred from personal contact. But Dr. Miller was, and will ever be, his own best biographer, and he revealed himself with unusual fullness in his writings. His personal letters must have a very special value for purposes of biography, and I would here suggest that these should be collected, edited, and published for the benefit of a world that knows him no more in the flesh. There is evidence that those who were fortunate to receive his letters have preserved them carefully, and in places readily accessible. I should not be surprised to learn that letters from Miller have survived when love-letters have been destroyed.

When I cross over to America—as I hope to sometime—I shall expect to meet a number of beekeepers who are better and happier because they knew Dr. Miller. I am better myself merely because I have read some of his writings, and have seen him brightly through the eyes of others. One may truly write of him that "his life was gentle, and the elements so mixed in him that Nature might stand up and say to all the world, 'This was a man!' "

The Production of Comb Honey.

By W. HERROD-HEMPSALL, F.E.S.

Apicultural Expert to the Ministry of Agriculture.

Author of "Beekeeping Simplified," "Producing, Preparing, Exhibiting and Judging Bee Produce," &c.

The production of good comb honey is one of the most difficult problems of beekeeping. Anyone almost can obtain extracted honey, but experience, care and constant attention are the human attributes necessary for success in the production of good sections. Climatic conditions also are no mean factor in the work. The best sections are produced when nectar is coming in rapidly and continuously from start to finish. The slightest check in the flow will result in uneven and irregular work both in the building of the combs and the sealing over of the honey.

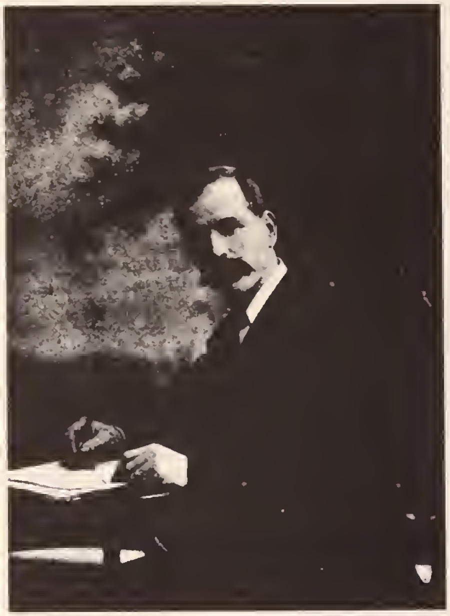
A good commercial section must have the following qualities: (1) The comb built and filled right up to the wood on all four sides with few, if any, pop holes; (2) the cappings must be even and white in colour, except in the case of sainfoin honey, when they should be a pale straw colour; (3) the cappings must be thin, almost transparent, and absolutely dry. A greased capping is fatal. The cappings should be slightly raised and sealed so that each cell is clearly defined. The comb should consist of worker cells only.

In America at the present time the production of good comb honey is a question well to the front in debate, and as in this country it would appear is rapidly becoming a lost art.

For some years to come its production in this country will be difficult, owing to the necessity for using foreign races of bees, which, as a rule, do not excel in the sealing of honey, giving either a greased or very rough capping. In my opinion, there is no bee which beats the British for the production of first-class sections. Another factor against the production of comb honey is the extravagant price of sections.

The first precaution will be to carefully select for breeding purposes those colonies which are observed to show the best work in filling and sealing. This will require several years of careful work to accomplish.

When the right strain of bees has been secured and the time for working them to full advantage has arrived, it will be necessary to commence preparations for the harvest early in the year. In fact, it is better to *commence the previous autumn*, by seeing that all the colonies have an abundance of food stored in the combs so that Spring feeding is unnecessary. If this is neglected, then stimulation by feeding must commence early in the Spring. Where the former conditions prevail, stimulation is carried out by bruising the cappings covering the food round the brood patches from time to time. By this means in either case the colonies are brought to full strength at the right time, *i.e.*, just when the honey flow commences.



W. Herrod-Hempsall, Esq., F.E.S.

The best comb honey is produced in *two bee way sections* with the thinnest possible dividers; these, for preference, should be made of wood.

The rack used must be one where both side and end movement is possible. A following board, with strong spring blocks at one side and the end which will hold the sections tightly together and keep them square, is absolutely essential.

The sections should not only be two bee way, but should be grooved at the sides and split at the top. To avoid breakages when folding, the three V grooves should be damped on the outside with hot water. *The foundation* must be the thinnest obtainable, and cut so accurately that it will slide into the grooves without the slightest sign of buckling. Full sheets of foundation *must* be used, and the foundation must *not* touch the bottom of the sections, a quarter of an inch space being left between the two. As already indicated, the dividers should be thin, the usual ones sold made of tin are far too thick. Thin wood is the best, as they are warmer than metal ones (please don't sit on me, Mr. Editor), but have the disadvantage of buckling and splitting with the variating temperature; the constant renewal from these causes makes them expensive and not a commercial proposition. As a compromise I use zinc ones, which, although more expensive, are thinner than the tin ones. The foundation *must* be *soft* and *fresh*. If it has been on hand for some time it should be softened and freshened by warming in the sun or in front of the fire before being fitted. The use of hard foundation will check and also result in irregular and unsatisfactory work.

To use or not to use a queen excluder when producing comb honey is a debatable point with many beekeepers. It is not imperative, but I prefer to use it as I consider that although it does to a certain extent hinder the bees in their work this is preferable and is compensated by the elimination of all chance of the sections being spoilt by having brood reared in them. It is also more difficult to get the bees to take to the sections with, than without, the excluder. I made a compromise by putting the rack on without the excluder; then when the bees have taken possession of the sections, it is put on. Another method of inducing the bees to come through the excluder is to put bait sections in the rack, *i.e.*, one or two sections with a little honey in them which have been saved from the previous season; or a slow feeder may be placed over the rack to attract them up.

The next point is to *put the rack on at the psychological moment*. This must not be done too soon, or it will delay the work in the hive by giving more space than the bees can occupy and which absorbs and wastes the heat generated by them. If delayed then, the bees get swarming fever, become demoralised, and swarm instead of working in the sections. The right time to put on the super is when the brood chamber is *crowded* with bees to overflowing, and nectar is coming in so freely that the food cells next to the top bars are elongated to receive it, thus showing whitened edges. If put on when these conditions prevail the bees will be merrily at work building out the comb in the sections within an hour.

When it is borne in mind that a temperature of 98 deg. Fahr. is necessary for the secretion of wax and the proper ripening of the honey, the necessity for keeping the bees warm in the rack can be appreciated. Add to this the fact that by separating the sections with dividers we have twenty-one miniature colonies of bees, all of which must have the aforementioned temperature, the absolute necessity for seeing that the rack fits well down on to the lower chamber so that there is no waste of heat by draughts through chinks, and also for well covering the top with quilts to prevent the escape of heat in that direction is realised. *It is this enforced crowding of the bees and wrapping down to retain the heat which makes the prevention of swarming when working for comb honey so difficult.*

So soon as the central combs in the first rack are drawn out and filled with honey, and the bees commence to seal them in the centre, it must be lifted and an empty one put in its place, on the top of which the partially filled one is placed.

The art of getting good work, therefore, is to have all the sections crowded with bees to keep up the temperature in each one of the miniature colonies as aforementioned, and at the same time provide work a *wee bit in advance* of the requirements of the bees.

As soon as the sections in the racks are all sealed over they must be removed. If they are allowed to remain on the hive too long they become *travel stained;* the bees also are apt to thicken the capping, by adding more wax. While commercially this is good, as the sections travel much better with a thick capping than a thin one, the latter has a more delicate and tasty appearance which adds to its selling value.

When the honey flow begins to wane it is not advisable to keep on adding fresh racks, or many unfinished sections will remain on hand at the end of the season. At this period it is advisable to clear the racks of bees by means of the escape board, then remove all those sections which are completed, put back the unfinished ones in one rack, and return it to the bees for their completion. If there are more unfinished sections than one rack can accommodate, they should be kept back, and as those which have been returned are completed they can be removed without taking off the rack and their places filled with the unfinished ones on hand. In this way a full return is obtained.

After the harvest has been obtained it will be necessary to preserve it in the best condition. On no account must sections be *stored* in a damp atmosphere or near the ground or they will absorb the moisture so that the cappings become covered with a wet sticky mess through the honey leaking through them. In this condition they are absolutely unsaleable as comb honey. They must also be kept in the dark, otherwise the honey will granulate, this, too, rendering them unsaleable. *The best place to store sections is in a dark, warm, dry and dust proof cupboard.*

Many more minor tips could be given, but I have already trespassed too much on your valuable space, and the reading of much more matter on this subject would, I am afraid, tax the patience of your readers. I have given the salient points; these, together with the observations and common sense of your readers will, I trust, enable them to obtain more and better sections in the future.

Beekeeping Conditions over the United States.

By E. R. ROOT.

Editor of "Gleanings in Bee Culture."

Author, "Bee Diseases," "Feeds and Feeding," "Wintering Bees," &c. Joint-Editor, "The A.B.C. & X.Y.Z. of Bee Culture.

You will remember the Frenchman who thought all the world could *parlez-vous* because he could when he left his native country. There are many beekeepers in the United States who, dissatisfied with their old environments, short crops, or irregular seasons, long for bee pastures new. Like the Frenchman, they leave home thinking conditions will be the same, only to find that not only are the new pastures no better, but that the conditions are entirely different. While they do not encounter a new language, they do find that they have to unlearn much of which was applicable to their own locality, and at the same time learn some new things they did not know before. This does not mean that real bee nature or bee behaviour is any different, but it does mean that the bees, like or unlike the Frenchman, have to *adapt* themselves to conditions that are totally different from the conditions that prevailed in the locality from which our beekeeper came.

The first condition he may bump up against is that of getting his colonies ready for the harvest. Real active brood-rearing may have to start weeks and weeks before the orthodox time in the East. Going on the basis that he will not have any real honey-flow before June or July he may have his colonies altogether too weak for a flow that may come in April or May in his new climate.

Again, he may encounter a condition where the bees cannot get natural pollen at a time when they ought to be breeding heavily. This does not ordinarily occur in the Southland, but it does in some places.

He may discover that after the main honey flow comes on there will be no swarming, and he may wonder why. The honey sometimes comes so fast that swarming is forgotten.

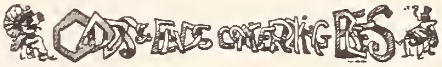
Again, in warm climates bees may breed a little every month in the year. The result is worn-out queens just before the main breeding season should occur. The colonies will be weak, and there will be a lot of supersedures. A colony in the act of superseding in the natural course of events may be delayed a couple of weeks before actual breeding starts.

In the extreme South, Mr. Beekeeper may find that he will have to raise two crops of brood before he will reach a generation of bees that can gather the main honey crop. It has been estimated that a cell of brood takes a cell of honey —probably a little more. Five or six frames of brood multiplied by two would require an equal number of combs of honey, or seventy-two pounds. When Mr. Beekeeper was in the East or North, 30 to 50 pounds of honey would carry his colonies from fall till the following honey-flow. The queen has a chance to rest, and ordinarily stops in late summer; and if there is no fall flow there may not be any breeding again until along in February if the bees are wintered outdoors. It will, therefore, require less than half the stores in the North to carry a colony through the winter than it takes in most parts of California and most of the Southern States.

The warmer the climate the more danger of actual starvation and robbing.

There is another condition, and it is a serious one in California. A semi-tropical climate allows bee disease in the form of foul brood, either European or American, to continue on in a more or less active stage almost every month in the year. Where black bees are predominant the moth-miller is a serious pest. This means eternal vigilance the year around.

I have cited here only a few of the conditions one will meet when he moves to pastures new; and after having studied beekeeping conditions in the Southland and in California, I have concluded that the wintering problem in those places is even more serious than in the northern States, where the bees can go into a sort of quiescent sleep during which they consume a minimum of stores, and during which there is no danger of the spread of disease, no danger of robbing, no danger from the bee-moth, and no fear of starvation, provided the beekeeper himself took pains to leave a minimum of 25 pounds of stores in the fall.



By R. WHYTE.

DE MORTUIS.

To those of us who are in the latter half of life's journey there is a wistful sense of the "sorrow and the labour and the passing away of men" when one is brought to a realisation that the labour of someone whom one got to love as a teacher is finally brought to an end. The immediate past has seen the life's work finished of two outstanding apiarian pioneers in America.

In Gilbert Doolittle we had the strong, masterful original student of nature, keenly alert to harness, guide and use natural propensities in furtherance of human needs. In this matter right well did Doolittle serve his generation. His book on *Queen Rearing* will keep his memory green during many, many days.

In Dr. Miller I mourn a friend who for the past twenty years or more in *Gleanings* and the *American Bee Journal* has been indeed to me a guide, counsellor and friend. Scholar, critic and genial adviser, he passed on much shrewd counsel and many helpful suggestions during his long connection on the staffs of the two leading American bee papers. His humorous statement, his varied affluence of language, his exactness of expression and strong coherence, in which the sequence of his reasoning never disappeared through the crevice of a sentence—all this made his frank, gossipy writings spritely and instructive.

HONEY FOR BEE FEEDING.

Let me strike a note of warning against the practice of feeding bees with honey. Dr. Miller gave the advice to "take it for granted that all honey is foul-broody, unless you *know* it is not." Now that the I.O.W. situation is distinctly better. apiarists should be keenly on guard in the matter of introducing the various brood diseases that trouble beekeepers in countries that we import honey from. It is not good advice to tell apiarists to feed their bees with honey, even when the advice is supplemented with the proviso to boil the honey before it is fed. How many, if any, will boil the honey sufficiently to destroy the vitality of the spores?* Dr. Miller says, regarding foul brood, "The chief and only cause is the presence of a microbe, and the disease is generally conveyed to a healthy colony by means of honey from a diseased colony. A drop of infected honey no larger than a pin-head is enough to start the destruction of an entire apiary." As to the advice to boil the honey intended for bee feeding, let it be remembered that it is well-nigh impossible to boil honey safely, as in heating the outer part will burn before the centre is heated much. Let water be added equal in amount and slowly bring to the boil and keep it boiling for at least a quarter of an hour. By far the safer plan is to feed sugar syrup if your bees are short of stores.

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* See THE BEE WORLD, Vol. II., p. 48.

NURSE BEES AND FORAGERS.

In considering the relative proportion of nurse bees to fielders we will assume a colony of some 50,000 bees with the queen laying normally. Let us also assume 42 days as the average life of a worker. If each bee spends 16 days as a nurse inside the hive, this would give us 16-42 equals 19,000 nurse bees in this colony, leaving 26-42 equals 31,000 bees as foragers. The proportion of nurses to foragers varies in the course of the season. In Spring the proportion of nurses will be larger as the output of eggs from the queen is daily on the increase: the converse holding good in the autumn when the queen's output is declining. If we may take it that these figures are fairly correct, it all points to the importance of having your colonies built up strong so that the proportion of foragers may be large when your honey flow comes.

DRONE LAYING QUEENS.

In the BEE WORLD for September, 1919, p. 84, Mr. Barratt mentions that *unflighted* virgins can be kept indefinitely. This, of course, *within certain limits.* Under normal conditions what age can a virgin be kept unfertilised before she starts drone laying? I have had virgins fully six weeks old before being fertilised.[†] I have never had a virgin start drone laying and *afterwards* become fertilised. I have never even heard of such a thing happening. We may take it, I think, that *once a virgin starts laying she will never become fertilised.* In a colony with a virgin queen, if drone laying starts within six weeks of the virgin being introduced we may be sure it is the work of *laying workers.* These workers will continue laying until the queen starts.

[We corroborate this statement, especially from our observatory hive studies.—ED.]

TO MAKE EXCELLENT MEATHE.

I have just been looking again into that "quaint and curious volume of forgotten lore, "*The Closet of the Eminently Learned Sir Kenelm Digbie Kt. Opened.*" This old book, published in 1669, contains a greater collection of recipes and directions for making Meathe, Metheglin or Hydromel, etc., than any other book published. The book is brimful of the excellences of its age with a certain amount of its conceits and puerilities. Sir Kenelm, I may mention, was the friend of Bacon, Galileo, Descartes, Harvey, Ben Jonson, Cromwell and all the famous folks of his time. Philosopher, man of science, occultist, privateer, conspirator, and Fellow of the Royal Society, his name ought to be remembered, if for nothing more, as one who has handed down to beekeepers a hundred and more excellent ways of making *honey wine.* Here is one of the simpler recipes, just as it appears in his book, *The Closet Opened*: "To make excellent Meathe. To every quart of honey, take four quarts of water. Put your water in a clean kettle over the fire, and with a stick take the just measure, how high the water cometh, making a notch where the superficies toucheth the stick. As soon as the water is warm, put in your honey and let it boil, skimming it always, till it be very clean; then put to every gallon of water, one pound of the best blew-raisins of the sun, first clean picked from the stalks, and clean washed. Let them remain in the boiling liquor till they be thoroughly swollen and soft; then take them out, and put them into a hair-bag, and strain all the juice and pulp and substance from them in an apothecaries' press; which put back into your liquor, and let it boil, till it be consumed just to the notch you took at first, for the measure of your water alone. Then let your liquor run through a hair-strainer into an empty woodden-fat, which must stand endwise, with the head of the upper-end out; and there let it remain till the next day, that the liquor be quite cold. Then tun it up into a good barrel, not filled quite full, but within three or four fingers' breadth (where sack hath been, is the best) and let the bung remain open for six weeks with a double bolter-cloth lying upon it, to keep out any foulness from falling in. Then stop it up close, and drink not of it till after nine months.

"This Meathe is singularly good for consumption, stone, gravel, weak-sight, and many more things. A Chief Burgomaster of Antwerpe used for many years to drink no other drink but this; at meals and all times, even for pledging of healths. And though he were an old man, he was of an extraordinary vigour every way, and had every year a child, had always a great appetite, and good digestion; and yet was not fat."

A very excellent wine, indeed!

My Particular Views on Queen-Rearing.

By E. PENNA, Bologna, Italy.

The international bee-literature is rich in books about queen-rearing. The best of all for me is *Scientific Queen Rearing*, by the late Mr. G. Doolittle, to whom all queen-breeders are so much indebted. That fine worthy book is particularly dear to me, having been the first I read on its subject matter, and my principal guide when making my first steps in queen-rearing. Though Mr. Doolittle is the teacher and the inspirer of all those who have written afterwards about that subject, I thankfully admit that I have found a valuable help also in other writers. Of course in queen-rearing, as in the great majority of intellectual undertakings, *a great deal of work is left to the initiative of the pursuers.*

Many are the difficulties that arise from the practical side of the matter for the actuation of the different operations, variable according to countries and climates. Besides that, the solution of the very theoretical and technical problems concerning the rearing by selection depends on the particular views of the breeders. So, from the time when I began to rear queens to this day, I have been gradually adopting my own views on many items, testing them at the trial of experience and convincing myself on many occasions that, by rearing queens and keeping bees on a very large scale, it is possible to get results that could not be obtained under other conditions, great as may be the skill of the breeder.

CHOICE OF THE BREEDING-QUEENS.

This is one of the very important items in queen-rearing and requires much skill and the most careful attention of the breeder. First of all, I must confirm what I have said above, *viz.*, that a first-class scientific breeder must be also *necessarily* an extensive apiarist for the production of honey. He must be the first to try and use largely his own queens in order to detect all their good qualities and their defects in the heading of large colonies and in order to have full occasion of selecting his breeding queens by a most accurate and well weighed choice.

I have twelve out-apiaries for extracted honey, and, as a rule, do not keep queens of more than two years old. We therefore requeen a very big number of colonies every year, introducing as many of our own newly fertilised queens. I bring the most careful attention and close observation to the queens that show wonderful qualities in order to choose the very best of them to be employed as *breeding-queens* in my queen-rearing apiaries, and do not hesitate to say that I always make my choice in such a careful and well weighed way as may be desired.

The qualities I prize most in queens are:—

(a) Fair, plentiful and seasonable laying, with a marked inclination to push breeding with great rapidity in the spring months and considerably reducing it as soon as the main honey harvest is in its height.

[†] THE BEE WORLD, Vol. II., p. 28.

(b) Giving best honey-gathering and good tempered bees.

(c) Disinclination to swarm.

THOROUGHLY AVOIDING "IN-BREEDING" AND SECURING AS FAR AS POSSIBLE BEST DRONES FOR THE MATING OF QUEENS.

In the provinces of Emilia, where my queen-rearing apiaries are located, the Italian race of bees is in the height of its purity, health and fairness. This is the centre of Italy, with no opportunity for mismatings. Mr. C. P. Dadant, when visiting Italy in 1913, was so astonished at the beauty and absolute uniformity of bees in the province of Bologna, that, when writing afterwards in *American Bee Journal* about my apiaries, he said: "The conditions of queen rearing in this apiary are unique." (*American Bee Journal*, January, 1915)

Though the particular conditions of this province avoid all troubles about any possible mismating of queens and safeguard the purity of the race, there is here, of course, as in any other plaçe, the *danger of "in-breeding."* So I have done my best to find out a plan by which that danger should be avoided in the best possible way, securing at the same time as many probabilities to have the queens mated with choicest drones, as practically possible.

Avoiding "inbreeding" is a point of so much weight, so generally acknowledged for the breeding of all kinds of animals, that I hardly need waste any words to emphasise its importance also for bees.

It is well known that there is a great difference of temper and working qualities between strains of bees of even the same variety. We have obtained through selection two *quite distinct* strains of pure Italians. From *strain No.* 1 we get through the most scrupulous choice the breeding queens from which we take the larvae for rearing the queens that are sent to customers. *Strain No.* 2 is for the drone line and gives us the extra selected queens for the production of drones to mate the queens reared from the breeding-queens of strain No. 1.

In our queen rearing apiaries at S. Ruffillo, the colonies headed by breeding-queens of strain No. 1 have drone traps at the entrances of the hives. The many other colonies (grafting, cell-building and incubator colonies) are headed by best queens reared from the breeding-queens of strain No. 2, and the drones of these colonies are allowed to go out freely to mate the young queens reared from the larvae of strain No. 1. Besides that, these queen-rearing apiaries are surrounded nearly two miles off by five out-apiaries in which the colonies are headed by extra selected queens of strain No. 2.

As regards avoiding "in-breeding" and securing best drones

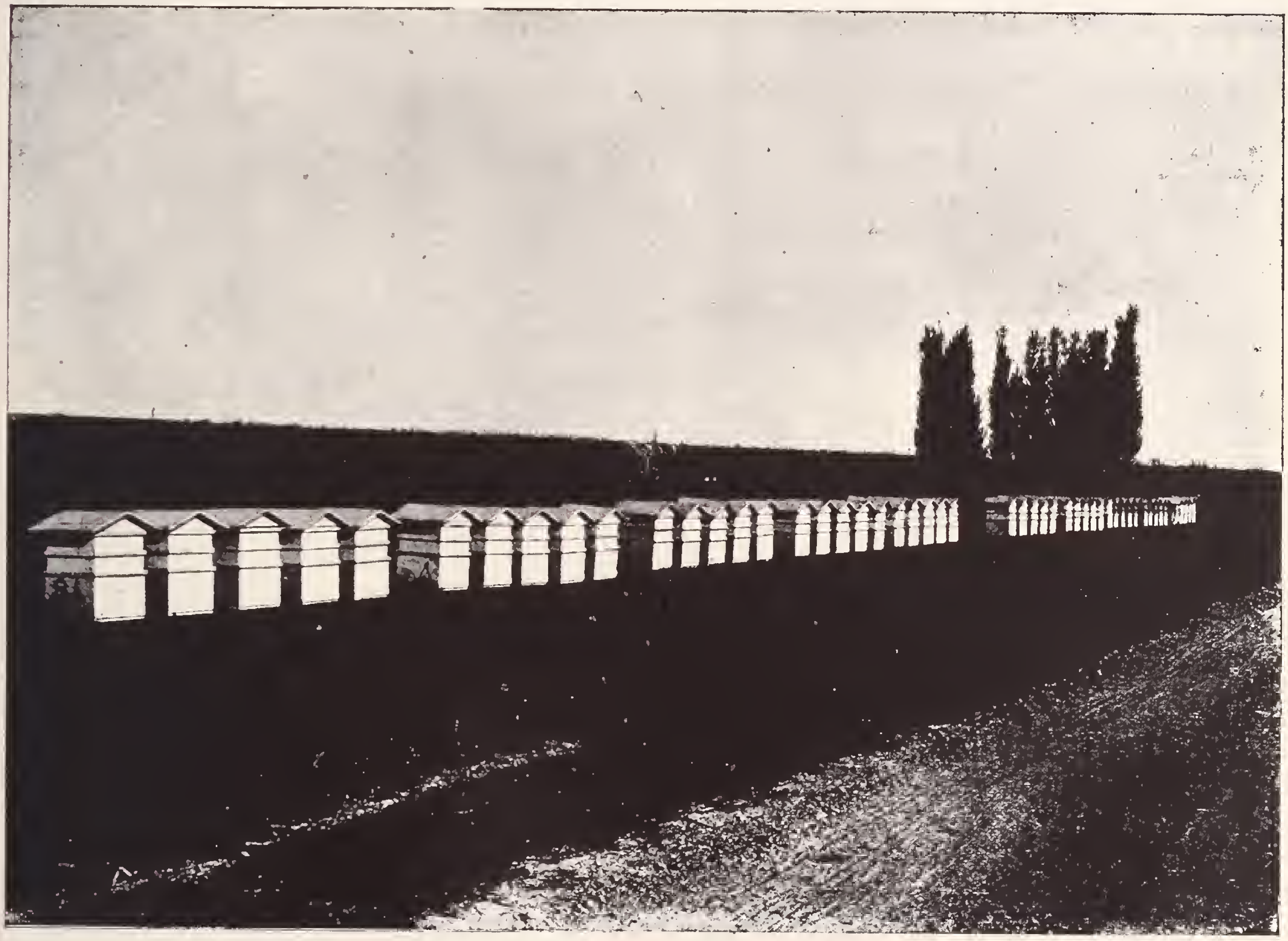

Fig. 17.—One of my twelve out-apiaries for extracted honey.

to queens reared from breeding queens of strain No. 2, we proceed as follows:—

When cells that were grafted with larvae of strain No. 2 are 10 days old, we bring them to the apiary located in the garden of our town home some miles off and give them to the nuclei we keep there for that purpose. In that apiary, drones are supplied by several colonies headed by the best queens I can get from other apiarists of central Italy when visiting them in my trips. So strain No. 2 is continually crossed with other strains of pure Italians.

Seven of our out-apiaries are re-queened every other year with queens of strain No. 1 and the other five out-apiaries with queens of strain No. 2.

THE BUILDING OF QUEEN-CELLS.

We give that very important point the most careful attention according to my particular views. We choose for grafting larvae aged nearly 24 hours and make the operation in laboratories built up for that purpose. We transfer larvae in damp warm air, temperature 25 degrees C. (101 degrees Fahr.) and hygrometer 70 degrees. Dampness is very advisable in our case because we transfer each time a great many larvae, and the larval food would dry up if kept for a long while in a dry atmosphere.

In our grafting houses the colonies headed by breeding queens are in the front walls and a door behind the hives enables us to take the larvae from within the laboratory, thus avoiding to chill them in cold or rainy weather.

Regarding the building of queen cells, we have *three classes of colonies* and hives:—

(a) The colonies employed to start queen-cells (*grafting colonies*).

(b) The colonies to build up the started cells till they are capped (*cell-building colonies*).

(c) The colonies where the capped cells are kept till they are ready to be given to nuclei (*incubating colonies*).

All these colonies are in hives of different shapes and of our own invention and making

Many breeders have their queen-cells started in orphan colonies or swarm boxes. We have for that purpose a class of colonies headed by best queens overcrowded with bees, well fed and placed in suitable hives (grafting colonies). The cells to be started are left in those hives for only 24 hours, when they are given to the second class of colonies (cell-building colonies) that must bring them up, on the plan of supersedure, till they are capped. These colonies, that afford the principal part of the work, are *very strong and well fed.* They are kept in large hives and headed by exceedingly good queens. In order that the cells should be built up as vigorously as possible, we never keep in these hives more than 16 cells at a time and never leave there any capped cells, as we think that (with the exception of swarming time) *a colony that is building cells will be more eagerly at work if there are no capped queen-cells in the hive* than in the opposite case. That is a very important point and a constant rule with us. So, as soon as the cells are capped, and before giving these colonies more

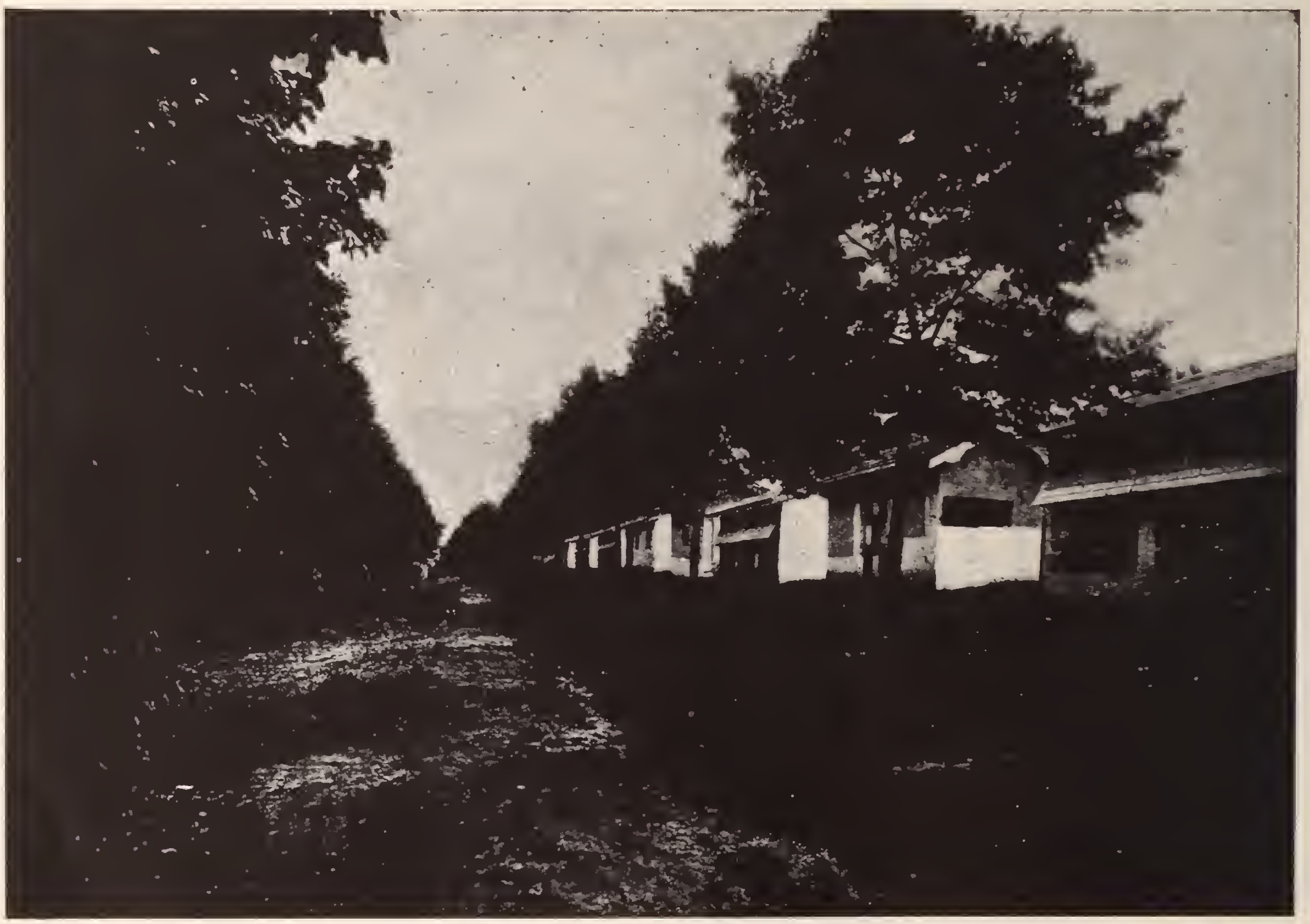

Fig. 18.—General View of the hives and laboratories for the production of queen cells.

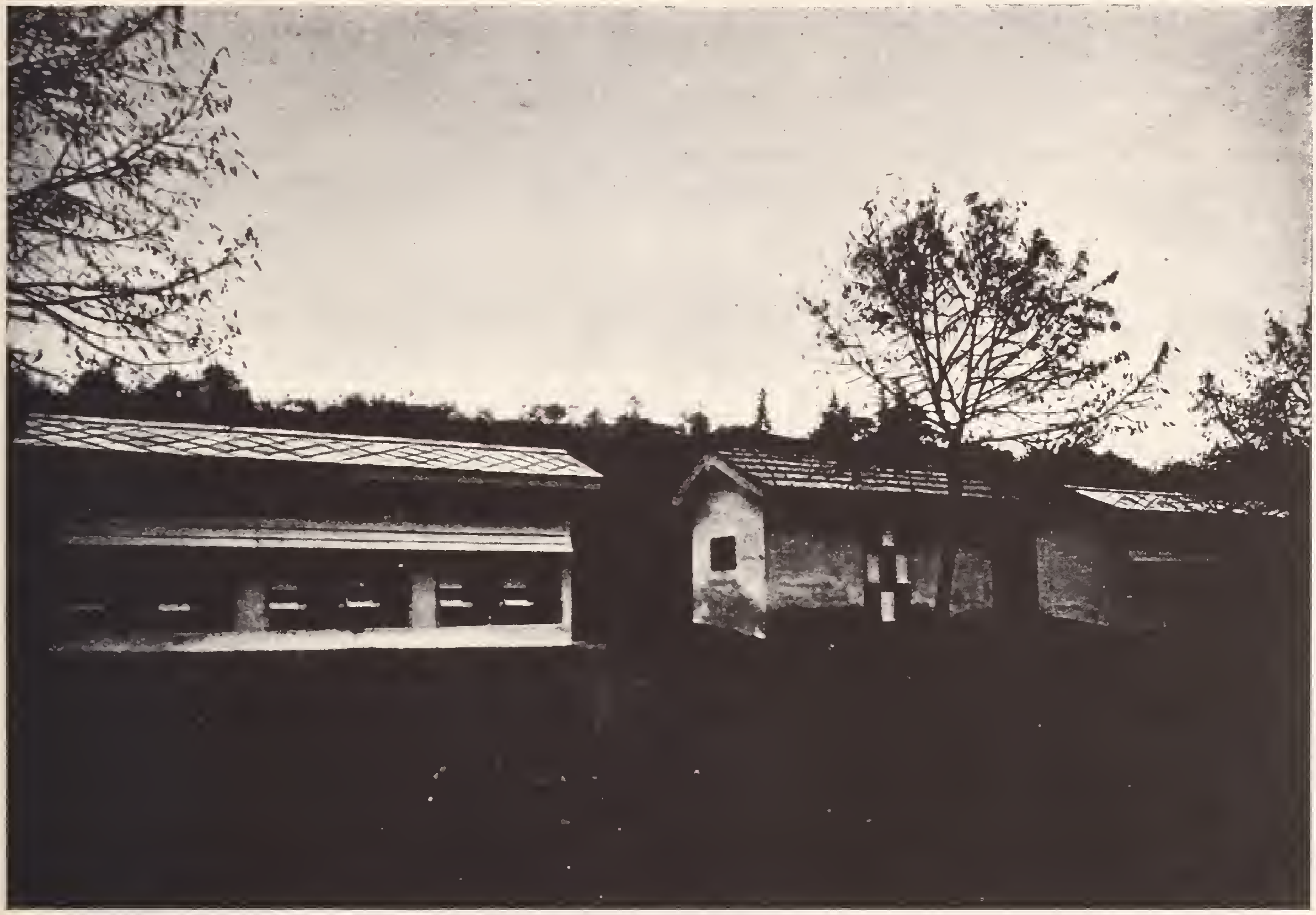

Fig. 19.--The grafting house for Strain No. 1. Nine colonies, headed by breeding queens of Strain No. 1. are in the front wall.

cells to build up, we transfer the capped queen-cells to another class of colonies placed in hives well fitted for incubating purposes (incubator hives). They are left there till they are 10 days old, when they are given to the nuclei.

JUDGING THE FERTILITY OF OUR QUEENS.

My queen-rearing specialists are perfectly aware that a young queen in a nucleus can be proclaimed fertile only when she has well filled at least a comb with eggs *regularly* laid. I inspect personally every day several of the "nuclei" from which the queens have been caught to be sent off to customers, and I expect in a most inflexible way to find them in the conditions mentioned above. This rule is absolutely vital for the reputation of a commercial queen breeder. Although these specialists are very clever fellows, well conscious of the importance of the regulations regarding the fertility of queens, they are in addition positively aware that, should I find one of those nuclei in a different condition from that I prescribe, the transgressor would be dismissed immediately.

Mr. E. Root says that "at times the eggs are deposited so regularly that one is deceived and the queen may be sold for a fertile queen, when she is only a worthless drone layer, but this can be determined after the brood is capped. Such a case occurs *perhaps once in a thousand*" (*A.B.C. and X.Y.Z. of Bee Culture*). I do confirm that statement by my own experience. Perhaps the nuclei used by the A. I. Root Company are smaller than ours, as I read in the same work: "The average age at which queens begin laying, is about 9 *days;* we generally wait 10 *days* from the date of hatching, and are then pretty sure of finding them ready to send off." Such prominent breeders as Messrs. Root have certainly their good reasons for doing so. In my opinion and in our case, one day of laying would *not* be sufficient either to judge about the regularity of the laying, or to keep our nuclei sufficiently strong. *We keep the queens laying nearly* 3 *days before we send them off.* Our supervision is consequently very efficient, so that we may safely say: "Such a rare case of a regular drone layer occurs perhaps once in two thousands."

We are very quick and steady in all cases of suspected unfertility. My men have the precise order to destroy all the queens which do not begin to lay *regularly* and *plentifully* after their wedding flight. I often see by the extra height of cappings in the combs of such nuclei that we were right in killing those queens, but it is exceedingly rare (just once in two thousands) that we find high capped brood in the nuclei the queens of which were judged to lay regularly.

WHY WE DO NOT KEEP BABY-NUCLEI.

In the catalogues of the American breeders of Italian queens it is said that only "the *tested* and higher grades are guaranteed to be purely mated." As we have not the least danger of mismating, all our queens are *naturally tested* and we only want to be able to judge quickly about their fertility, which can be more surely done in rather large nuclei.

When comparing the prices of American and Italian breeders, it is to be remarked that the queens from Italian breeders who keep their bees in provinces where the race is as pure as in the province of Bologna, are *all* naturally tested.

The Mating of Queens.

By JOSEPH TINSLEY, F.E.S.

Lecturer on Beekeeping, The West of Scotland Agricultural College, Kilmarnock.

Author, "The Production of Honey," "Some Bee Diseases," &c.

It is generally believed that queens are never mated with drones from their own hives, but our recent investigations so far tend to contradict this belief. It is quite possible to even ensure, with scientific care, pure mating in an apiary consisting of several varieties of bees as reported for the early work conducted at Benson (BEE WORLD, September, 1919). The chief commercial value of this would probably be in the raising of "Breeder Queens." During 1920 the College Apiaries have been to a large extent utilised for breeding purposes, the object in view being to produce varieties of bees which show an appreciable resistance to bee diseases. In this respect we have been considerably assisted by having a resident apiarist in the person of Mr. A. G. Rait, who is not only a clever beekeeper but a most enthusiastic worker in the cause of science. In carrying out the work we appear to have established some new facts and exploded several accepted theories. Many of our experiments, however, require repeating to establish absolute proof, as it is not our intention to make definite statements which we cannot repeatedly verify.

Observatory hives have been largely used in our work relative to the mating of queens.

When the virgin hatches she may take a short flight a few days later, and further flights on successive days, if the weather is favourable. Some have taken as many as six flights before the actual mating trip. These flights are of short duration, varying from one to three minutes. The weather is an important factor in this respect. Singularly there is no excitement displayed by the drones in the hives. By some peculiar instinct they seem to know that the virgin is only exercising her muscles and incidentally becoming conversant with the surroundings. But when the appointed day arrives the drones in the hive are ready and are on the wing. It is obvious that the drones in the hive, be they related to the queen or otherwise, have the best chance of overtaking her; and judging from the time occupied for the mating trip, the queen does not go very far afield. We have had queens mated in five minutes.

In breeding over 100 queens we have had fully 90 per cent. pure mated.

Joseph Tinsley, Esq., F.E.S.
This illustration also shows one of the Apiaries of the West of Scotland Agricultural College.

Beekeepers (and principally those beginning to specialise in breeding) should work on definite lines to improve their stock. Select the breeding stock for the female line and also single out the male stock. There is no difficulty with the former. Cell cups give every capable beekeeper an opportunity of transferring the necessary grubs. Drones can be reared in a selected stock with either deep or shallow frames. Drones should be on the wing or ready to fly when the nuclei are formed. Into each nucleus that is formed place about 50 drones, or shake a few in. Hand picked drones are to be preferred. In making up the nuclei, take care not to take any drones from those colonies from which you are removing bees and brood. An excellent plan for producing drones is the use of a shallow super (with frames fitted with drone foundation) into which the queen can gain admittance.

We have not been able to prove that drones congregate

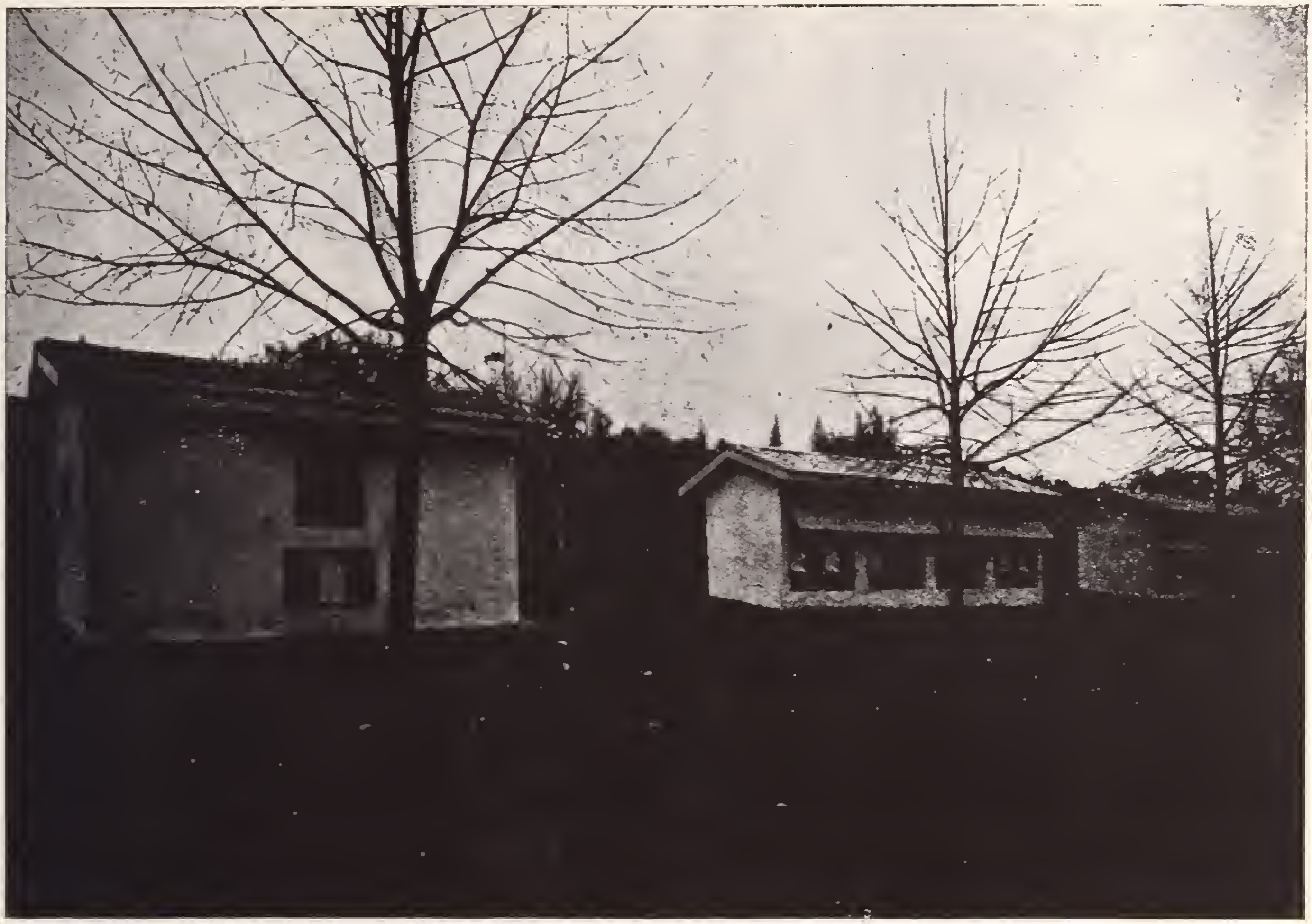

Fig. 20.—The grafting house for Penna's Strain No. 2. Three colonies, headed by breeding queens of Strain No. 2, are in the front wall

in other hives during the summer in large numbers. We tried placing Dutch drones into full colonies headed by Italian queens, but they were immediately expelled. In the late Autumn an occasional queenless stock had a few drones from adjoining hives.

Selective breeding at the present time is the only hope for the industry. By eliminating "in-breeding" and by the practical application of scientific knowledge, there seems no reason why the present progressive movement should not be enforced and maintained.

The question of selective breeding and selective mating is not a little influenced by the method of beekeeping in practice to suit local conditions. We are at present experimenting at Kilmarnock with various frames, including the Simmins, Langstroth, Dadant, Jumbo, British Deep Standard, etc. At the end of this year we hope to give beekeepers the benefit of our work.

A point overlooked by several writers in the Bee Press is that the bees in the United Kingdom at the present time consist of several foreign varieties and their crosses. These strains are largely experimental. The queens of such breeds deposit eggs more quickly than our old "black" race; consequently the present standard frame is too small. The question is, will the introduction of the foreign bee continue, or will an effort be made to bring back the bee indigenous to this country? If the former, then the larger frame must be used; but if the latter, the present standard frame is quite satisfactory.

Bits of Foundation.

By J. HERROD-HEMPSALL, F.E.S.

Editor, "The British Bee Journal" and "The Beekeepers' Record."

GREATER HONEY PRODUCTION.

This should be the aim of every beekeeper and the end of all operations. Queen rearing, hive and appliance designing should all have the one object in view, to help to increase the production of honey. The article on page 1 by Mr. Jarman should be read carefully, and its lesson taken to heart. It is labour in vain to breed very prolific queens, and handsome three to five banded workers unless they are able to deliver the goods. It is not always the colonies containing the most bees—that is the strongest colonies—that give the most surplus. Would it not be well for queen breeders in general to devote more thought to producing queens whose progeny will be longer lived than abnormally prolific queens that will give workers whose life is short? In the latter case too large a proportion of the honey is used in brood rearing.

POLLEN COLLECTING.

The article by Miss Betts (page 10) is both interesting and instructive. She has been paying attention to this subject for some time, and some years ago exhibited a chart at one

Fig. 21.

of the Royal Shows. The beginning and end of the yield of pollen from a variety of flowers was shown by a number of coloured bands, each band representing the colour of the particular pollen indicated. Unfortunately it is impossible to make a general chart, as the time that any particular flower blooms varies so much in different parts of the country, and flowers that bloom profusely in one district are not found in another. A study of this subject will enable one to find out the principal honey producing plants of one's district, also their time of blooming, and will indicate at what time of the year colonies should be at full strength for the honey flow.

QUEENS TAKING A CLEANSING FLIGHT.

From evidence that has been given at various times, I have no doubt that queens do fly out of the hive at times, but whether for a cleansing flight or an airing I cannot say, probably the former. This, I think, is often the cause of colonies mysteriously becoming queenless.

GROWING BEE FORAGE.

This cannot generally be done in this country with any degree of success as a means of procuring surplus, but something may be done in the way of providing flowers near the hives in the early spring when the weather does not admit of bees flying far from home. Mr. Harwood is a good guide to follow in this matter, but may I suggest he gives the common name as well as the botanical one where possible? I am afraid many readers will not, for instance, recognise *symphoricarpus herberis* as the snow berry.

A plant that appears from the reports on it from the United States to be worth growing, especially on poor soil and waste spaces, is sweet clover. Originally looked upon in some of the States as a noxious weed, it has now been found to be a valuable forage plant as well as a good nectar producer. It has also another advantage, that of enriching the soil upon which it is grown. Unfortunately the seed is not yet very plentiful, as the demand exceeds the supply.

◆

The Egyptian Bee (Apis mellifica var. fasciata, atr.)

By CAPTAIN (Retd.) EGON. ROTTER, Hohenelbe, Czecko-Slovakia.

[Translated by Miss Annie D. Betts from "Der Deutsche Imker aus Böhmen," Feb. 20, 1920, by kind permission of the author.]

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Apis fasciata is a native of Egypt. It was introduced into Germany in 1865 by the *Berlin Acclimatisation Society*, and Hr. Vogel, of Lehmannshöfel, was entrusted with its further cultivation and distribution. Much was expected from the

Figs. 21 & 22.—The apiary in the garden of Penna's town-home where Strain No. 2 is continually crossed with other strains of pure Italians.

acclimatisation of *A. fasciata*, especially after Dr. Gerstäcker's lecture on the varieties of the honey bee and their geographical distribution; and it was hoped also to exert a favourable influence on the somewhat phlegmatic northern bee by cross-breeding. Vogel's cultivation of the Egyptian bee, which was undertaken with an extraordinary skill, knowledge, and enthusiasm, led indeed to good results as regards crossing; but pure-breeding was not satisfactory, since *A. fasciata* showed too little capacity for adaptation to our climate.

The Egyptian bee has a very singular *appearance*, conspicuous from the contrasts of its wonderful colouring. The first three to three and a-half abdominal segments of the worker are reddish-yellow with a black border; the red is transparent when held against the light. The remaining segments are deep black and strongly glossy. The underside of the abdomen is shining yellowish, as in the Syrian and Cyprian bee; in contradistinction to the Italian bee, in which the underside shows more of a dull dark brown shade, often passing into black. The scutellum is reddish brown. *A. fasciata* is the *smallest* of the races belonging to the species *mellifica*. I received the smallest specimens of this variety from Luxor (Egypt); they were, when alive, not much larger than our house-flies. The elegant, slender form and agile movements arouse special pleasure; so that this bee, especially when at play in front of the hive, is a real feast to the eyes and the pride of its owner.

In the drone the first two abdominal segments are partly golden-bronze; the remaining black rings have a border of this colour. On the sides and the underside of the abdomen the golden-bronze colour is more pronounced. Egyptian drones differ (to the advantage of their appearance) from drones of northern race in their slim form, and do not attain the size of the males of our races. In the queens the pigmentation of the first four abdominal segments is red-gold, with a shining black border from the second ring onwards. The black border grows broader on each succeeding segment, so that the tip of the abdomen is entirely black. The red-gold is often transparent, which enhances still more the effectiveness of the colouring. The legs are also partly golden-coloured. The second to fourth abdominal segments stand out more prominently, on account of their bow-shaped convexity; this provides an obvious character for distinguishing the queens from those of other races. I did not observe in my specimens the blood-red colouring of the first abdominal segments, which (according to Vogel) is often present. It is possible that queens so coloured were crossed with Italian blood; for at the time when *A. fasciata* was being bred in Germany, the cultivation of *A. ligustica* was at its height, and this latter race was represented in almost every apiary. The scutellum of queen and drone is dark. The fur-like, conspicuous hairiness of workers and drones is white with a silvery shimmer; that of the queen has a more yellowish-grey tinge. This conspicuous hair, which is especially marked in the worker and drone, gives to this bee a quite unusual arresting charm.

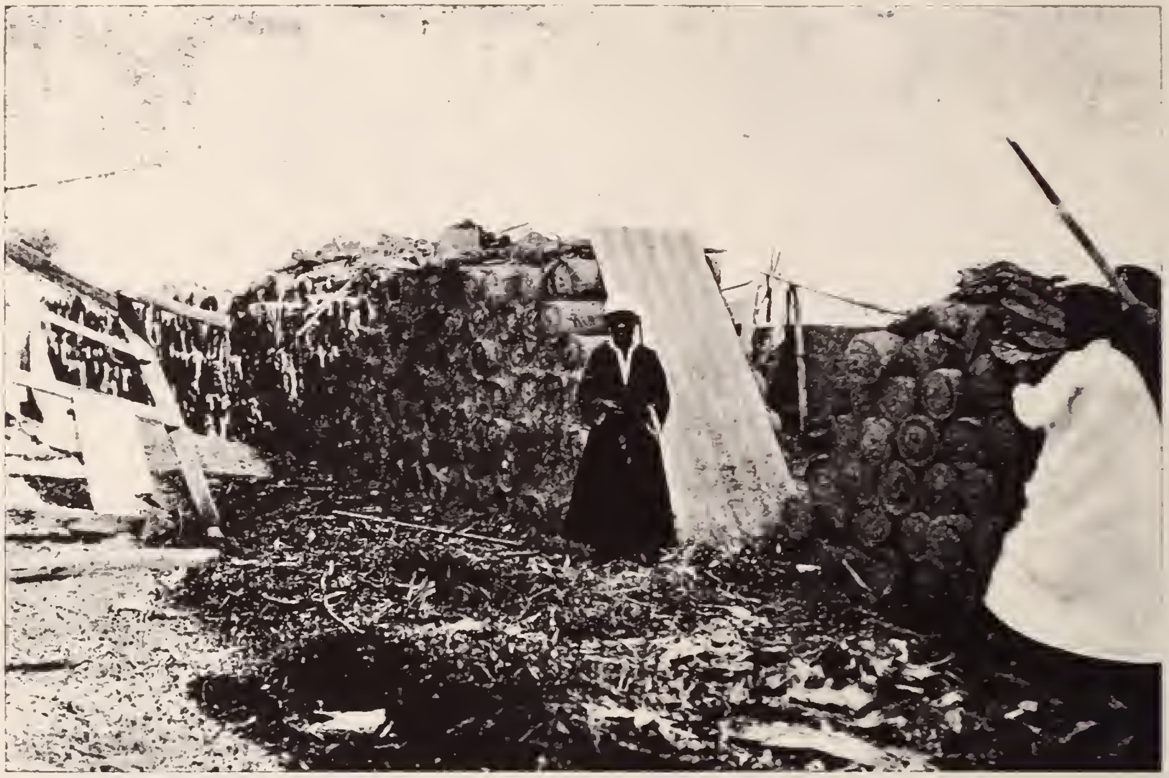

Fig. 23.—An old-fashioned Egyptian Apiary, nr. Cairo. The illustration shows mud hives piled up loosely, and two farmer boys in attendance.

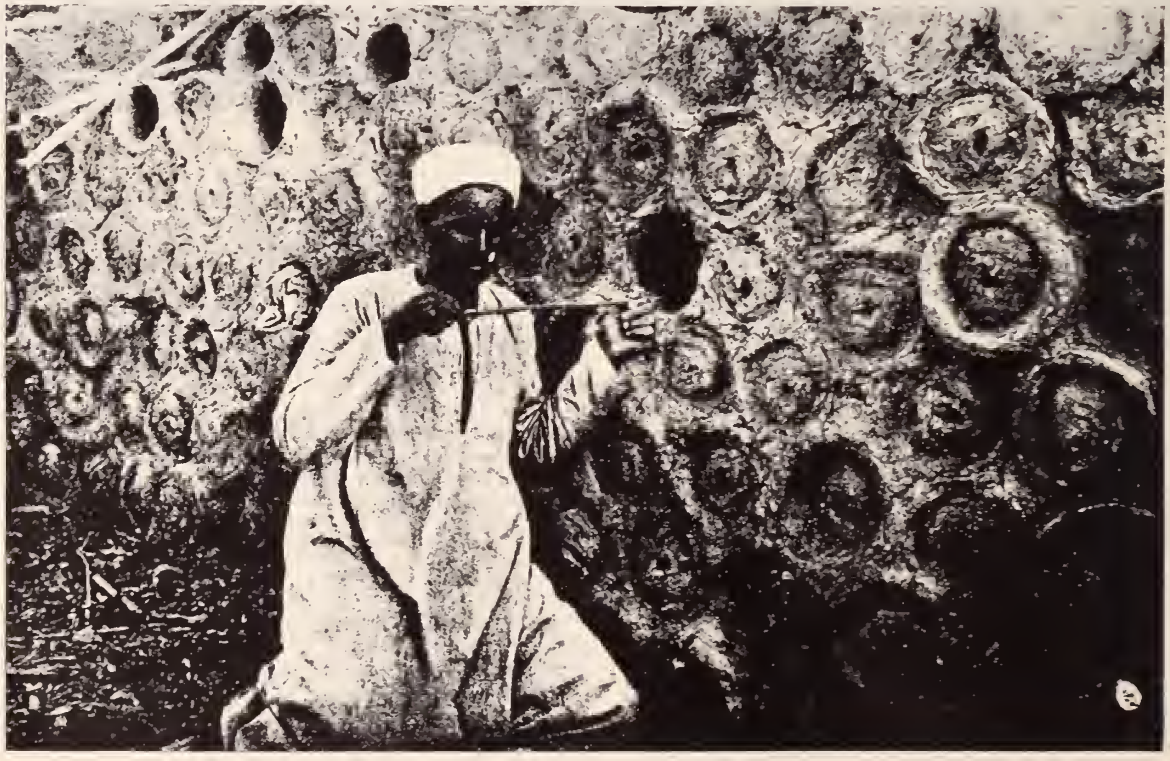

Fig. 24.—An old-fashioned Egyptian Apiary, nr. Cairo. The illustration shows the owner (who belongs to the poor smallholder class), provided with a long iron tool, removing the honey-combs from the tubes, which are firmly joined together.

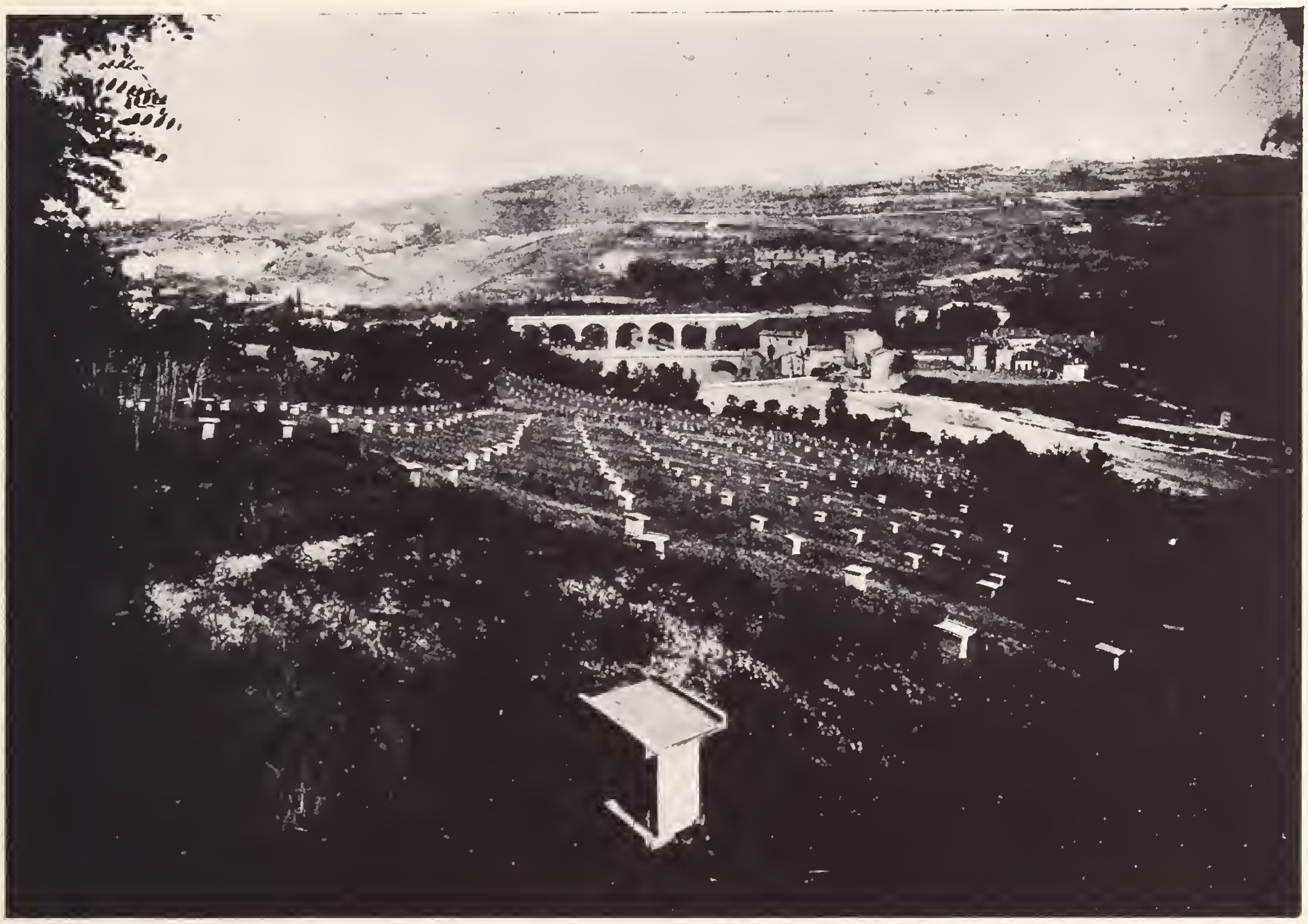

Fig. 25.—One of Penna's four yards of queen-rearing nuclei (350 nuclei are in this yard, and the other 650 nuclei are in the other 3 yards).

The Egyptian bee has, unfortunately, a *very evil* disposition, and exhibits the characteristics of a "wild" race in a specially marked degree. Of their own accord, unmolested, *A. fasciata* will, however, never attack; and one can stand in the flight-range of stocks that have not been disturbed without fear of being stung.

To work with smoke when manipulating is to call out a raging attack. Bees of this race are to be handled only with *cold water* (sprayed on them with a scent-sprayer), since this somewhat reduces their lust for battle. When the combs are taken out the bees do not remain on them (unless the spray be used at the right moment), but mostly fly off to fall upon their disturber, who can then do nothing better than to take to his heels as quickly as possible; for if once their evil tempers are aroused, the *stinging-fury* of these beautiful little demons knows no bounds, and the stings make themselves felt even through bee-dress and gloves, owing to the poison being then much more concentrated (judging by its effects). When disturbances occur, as for example owing to a sudden loud noise, the guards (those faithful protectors of the home) are at once reinforced; then in a twinkling, as if at the word of command, a large army ready for battle pours out of the hive entrance. The lively temperament of this bee is best illustrated by the impulsiveness of this proceeding. This innately lively nature also never allows *A. fasciata* to attain a state of real repose. If one is to bring stocks of this variety through our winter, every disturbing influence must be avoided, be it, for example, sunlight, noise, waves of too cold or too warm air, etc. The most suitable hives for this race are therefore *Kuntsch* hives, or others based on similar principles, with the cluster in an upper storey ("Obenüberwinterung," a recessed entrance, and a board turned up in front during the winter; or else total closing of the entrance in winter by a porous covering (Caesar Rhan's system).

Clustering (as observed in the races of bees kept in our country, as a means of protection in winter) is against the nature of the Egyptian bee, and she only resorts to it temporarily, in order to protect the brood—the queen never quite ceases to lay even in the hardest winter months. These pretty little bees are only too easily deceived into untimely flights by the warm sun-rays that often, even in February, announce the coming of an early spring; and the anxious beekeeper sees with sorrow the corpse-strewn ground in front of his apiary. Consequently, Egyptian stocks have dwindled considerably by the beginning of the early honey-flow, so that they then make a very poor impression. However, the almost unbelievable fecundity of the queen astonishingly soon makes good the lost hosts of workers; nevertheless, this race is only profitable in our climate where there is a lasting or a late honey-flow. Since *A. fasciata*, favoured by the Egyptian climate, does not need to collect much stores, and since, moreover, bees have been kept in Egypt for ages in small and narrow receptacles in which the accumulation of large stores is indeed impossible, this bee has had bred into her (so to say) *the habit of not collecting stores*, and this has become a plainly hereditary quality. We must also notice that *A. fasciata*, though she is undoubtedly more lively, quicker, and more industrious than the German bee, and therefore visits the fields more often in the same time, yet—on account of her small size—is behind the northern bee in respect of the quantity of nectar gathered.

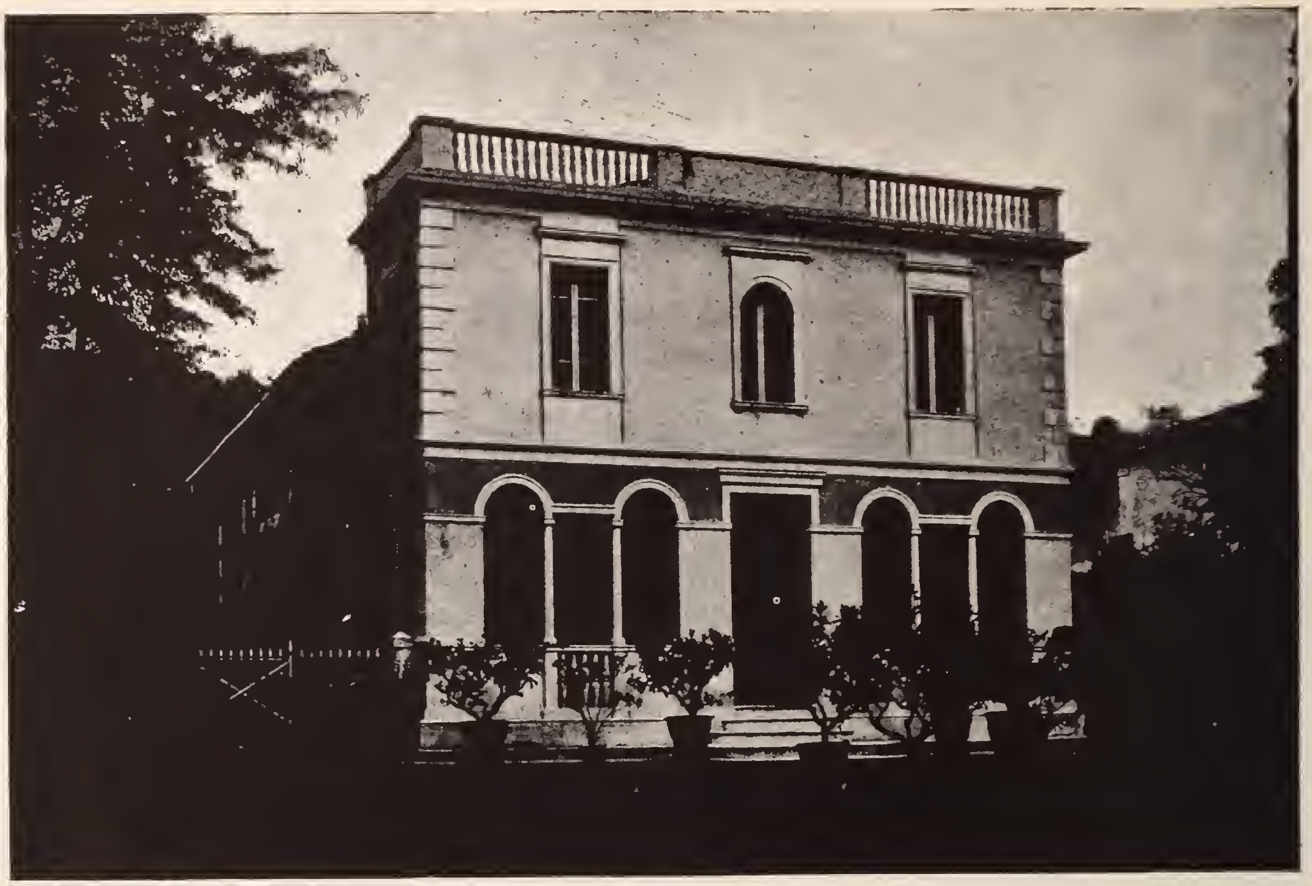

Fig. 26.—The Bee-factory and central warehouse for all Penna's apiaries.

A. fasciata takes to the supers very reluctantly, and can only be induced to do so by putting brood into them. As soon as they start flying, they do so in full force, and do not (like the German bee) send out at first only isolated foragers. A specially distinct characteristic of the Egyptian bee (as also of her nearest relatives, *A. syriaca* and *A. cypria*) in contrast with the races kept here, is the strongly-domed cappings of the honey-cells. This is due to the fact that the cells are always filled full to the brim with the noble sweet, whence the somewhat ashy-grey cappings appear as if wetted. This bee is equally strong and active in both attack and defence, so that surprise attacks and robbing out do not occur with Egyptian stocks. The sense of smell seems much more pronounced than in European races, for in spite of the greatest precautions I never succeeded in uniting two *fasciata* stocks, nor one of these with a stock of another race. This highly developed sense of smell and sagacity make themselves remarked also in the ease with which these bees find remote sources of nectar. Owing to their strong sense of direction, drifting of bees into other stocks is very rare. Egyptian drones are of a very ardent disposition; if, for once in a way, Egyptian stocks are at the height of their development during the swarming season, their masculine representatives—these amorous cavaliers—almost always bear away the palm of victory in the contest of the nuptial flight. In crosses of Egyptian queens with drones of other varieties, the first generation shows scarcely any change in the characteristics of the race; this is evidence for a particularly homogeneous racial composition. For this reason Vogel in his time described this variety as a *"primary race,"* while the *Italian* bee, which shows no such constant genetic composition, was termed by him a *"secondary race."* He was led by cross-breeding experiments to his assumption that the Italian bee is a secondary race and may have arisen from a mixture of the northern (German) and the Egyptian bee. The well-known investigator, Dr. von Buttel-Reepen, shares this view, and assumes, as a foundation for it, that after the Glacial Period *fasciata* blood may have spread to Syria, Asia Minor, Transcaucasia, and most Mediterranean lands. It is therefore likely that all the races of yellow bees found in these countries have been evolved through an admixture of *fasciata* blood.

The drones of Egyptian stocks are expelled, in this country, at the same time as are those of German stocks, but drones continue to be reared. One can hear the pleasant and cheerful hum of drones at play before the hive (pitched higher than that of northern races) even in winter, if that hard, cold fellow abates for a few hours his stern rule and the sun shines cheerfully and invites the insects—including our little bees, lovers of sunshine—to interrupt for a short while their winter rest and to dance joyfully. The workers also have a higher flight-note than in our races of bees. *A. fasciata* is much given to swarming, and is only surpassed herein by the Syrian bee. In strong stocks, at the time of their greatest activity, one may find 100 to 150 and more queen-cells.

Since the Egyptian bee builds *smaller cells*, corresponding to her smaller size, such combs cannot be used in the brood-nests of stocks of other races. It is therefore advisable, in the interests of interchangeability, to allow *fasciata* stocks to build only from foundation. While in the comb of *mellifica* there are only 19 cells per 10 cm., in that of *fasciata* we find 21. These bees differ from our natives in the total absence of propolis; this is not observed in the case of *fasciata's* nearest relative, the Syrian bee. Of extraordinary interest is the fact, already noticed by Vogel, that in Egyptian stocks *half-queens* exist along side of the real mother-bee; they are somewhat smaller than normal queens, exactly resemble them in form, but have a reddish-yellow scutellum instead of a dark one. A few of these mysterious beings (which emerge from worker cells) live in the stock on good terms with the regular queen, and take part in the egg-laying. From their eggs only drones hatch; these are distinguished from the drones of the real queen in having, not a dark, but a reddish-yellow scutellum. I was able to make this observation on the drone-layers in an Egyptian colony, the queen of which came from Luxor. (She was sent me through the kindness of Messrs. Schaich and Debarbouillé, directors of the "Upper Egypt Hotels Co.," from the apiary of a native.) In this stock also I was able to observe the peculiarity (common to this and the Syrian bee) that during the swarming season the virgins live together peacefully, until one of them returns fertilised from the marriage-flight, and thus the existence of the colony is assured. This last characteristic is said to have been also observed by Koschevnikov in *A. remipes* (the Caucasian bee). This state of affairs, differing from that found in European races, is probably attributable to the fact that *A. fasciata* and some of her nearest relatives, being markedly "wild" races, are still at a lower stage of evolution, owing to their more difficult conditions of life; to which the increased instinct of self-preservation is also due.

Even if the commercial value of the Egyptian bee be less than that of other races, yet the possession of such a colony is a valued treasure and ornament of anyone's apiary, on account of their different way of life, their extremely handsome and contrasted colouring and elegant form, and also because of the difficulty of procuring this variety of bee.

Bees have been domesticated in Egypt for ages; and the Egyptians, even in ancient times, made use of the different flowering-season of the flora of Upper and Lower Egypt (caused by the difference of climate). They combined to send the hives in specially-prepared boats to Upper Egypt in December, to where the sainfoin bloomed earlier and the bees could forage in the fields. Then they moved a few miles; till, journeying thus, by the end of February, they passed right down through Egypt and reached the sea. Here each owner took back his hives (they are said to have been numbered for recognition). At present the English authorities in Egypt (whose economic activities, both in the Mother-country and the Dominions, are extensive and exemplary), are trying to place beekeeping on a modern footing, and to make the country independent of foreign sources of honey-supply. As the honey which is gathered by the natives is out of consideration for European use, on account of the primitive way it is prepared (squeezing the combs with the hands), honey is imported from Asia Minor and the Mediterranean islands in great quantity for the immense trade due to pleasure-seekers and convalescents. The natives keep bees in simple small *tubes* made of *Nile-mud*, which are piled up either loose or joined together.

According to 1914 statistics there were in Egypt 8,583 bee-keepers with 533 modern hives and 260,190 bee-cylinders.

The climatic conditions in Egypt are very favourable for bee-culture, since there is no winter nor any marked rainy period there. The mean yearly temperature in Cairo is 21.3 deg. c. (70 deg. F.); the thermometer may, however, rise to 40 deg. c. (104 deg. F.), but it may also fall to + 4 deg. c. (39 deg. F.). The fertility of the soil is favourably influenced by the Nile irrigation system, so that the bees find rich sources of nectar in the great areas under "Bersim" (Egyptian clover) and cotton.

The improvement and modernising of Egyptian bee-keeping lie in the trustworthy hands of the Director of the Entomological Section, Ministry of Agriculture, Cairo, Dr. Lewis H. Gough, who (together with his assistant, G. Storey), is showing an exemplary activity and is also trying to increase the economic value of the Egyptian bee by importation of foreign blood and crossing (*A. fasciata*, as has been said, accumulates but little stores). In return for the Egyptian queens sent to me, the Ministry of Agriculture stipulated for a delivery of Golden and Carniolan queens; and was, as I learnt from Dr. Gough, successful in acclimatising the Golden bee (*A. aurea*) in Egypt.

To Dr. Gough and to his assistant, Mr. Storey, my best thanks are here due; as also to Messrs. Schaich and Debarbouillé, who have assisted me in the most friendly and unselfish way in the matter of queens, and with information about the state of beekeeping in Egypt, as also by sending me photographs.

Irish Bee Notes.

By the REV. R. DOUPE.

This is the time to prepare, or in some parts almost to complete preparation, for the coming season, and so a word about the housing problem beewards will not be out of season. In Ireland the chief factor to be considered is dryness, most hives, even when they do not leak, they soak water. I have tried many hive roofings, but all fail except zinc. Zinc will last as long as the beekeeper and longer than the hive. I use it on all hives, but for summer, or in a different climate, painted calico, if properly done, is quite good. Another necessity in this country for the same reason is the double hive, by which I mean an inside box and an outside case with plenty of clear space between, this tends to warmth in winter and coolness in summer, and to dryness of the inner part where the bees inhabit. Ants do not seem to do any harm in this country. They carry off waste bits of wax and parts of dead bees and such other things as the bees have no use for. All the same, when they start hatching their eggs on the quilts they are a nuisance to the manipulator of hives. Mice are very harmful and will not only starve the bees by eating the honey, but eat the bees themselves when torpid; the small shrew will live on dead bees and possibly live ones. Mice also destroy combs, which is a loss and very annoying when one has nice straight worker combs. Swiss entrances, when made completely of zinc, and adjusted nicely to let worker bees only pass, as no other want to in winter, effectively exclude mice, and are also useful as a help to prevent robbing, as well as giving good ventilation; they can be removed altogether in the honey flow by removing two eyed screws, which should be of brass or aluminium. Earwigs do no harm that I can see. The iron shoes for hive legs are quite useless as far as earwigs are concerned. Even wise bee-men speak of them as creeping in; they fly at night. I have caught them hunting moths; their wings are packed under the elytra, or wing covers, and very neatly folded and doubled over on themselves. I do not know how they could be kept out of the hive; possibly if the cases of hives fitted perfectly, in other words, were made of metal, say aluminium, the bees would protect the entrance. Another pest is the slug. When flight boards have extensions to the ground, slugs creep through the entrance, and in winter remain inside. Plenty of salt will do for slugs. In summer bees generally warn them off at the entrance and drive them out if they do enter sooner or later. There are different pests in other climates, but birds seem common to all, tits in this locality eat some bees, but can be killed or driven off. I never knew them to do serious harm; still they might be weakening the stock. Rat poison would settle their account.

Aluminium would be excellent for many accessories where tin is now used, and it ought to be getting cheap. One cannot now get aluminium ends for spacing frames, and tin only lasts a couple of years, or less. It would be the metal *par excellence* for extractors, so I hope some of our enterprising appliance manufacturers will take a hint if they see this.

Graded Sections.

By GILBERT BARRATT.

SWARMING CLUSTER.

In the October issue of the *American Bee Journal*, the following question and answer appear: "Why do the bees form a cluster on a tree while swarming, instead of going straight to the place that they prepared for a home.—The bees form a cluster because the old queen, being heavy with eggs when she goes, appears to be unable to take a long flight without preparation, at least this is the opinion of all experts."

This reply is an example, perhaps more often found in bee literature than anywhere else, of a hoary old fallacy, originally propounded, and copied from one book to another, until it has the appearance of unquestioned fact. The writers overlook the fact that after clustering, and if unhived, the queen is capable of a long sustained flight, and experience proves that a swarm always flies high and fast to, in the majority of cases, a distant goal. Another fact is overlooked, and that is, prior to swarming, the queen gradually reduces her egg laying, finally ceasing altogether, to fit her for her long, arduous journey. If this is accepted, we must look further for the reason of this clustering. It may well be, seeing that it takes some time for the swarm to leave the hive, that they must have some point of assembly, and naturally, this must be near their hive, and around their only hope of the future, the queen, and this is strengthened by the often proved fact that scouts are sent out to find a home or, as is often the case, if already decided upon, to see if still unoccupied, and the bees must gather together to await their return. An added theory may be advanced, that while clustering, every bee being gorged with honey, wax production must inevitably follow, thus reducing their load, and materially decreasing the time occupied in building their urgently required first comb. Very many beekeepers will have noticed, after hiving a swarm that has clustered some time, that wax has been formed, and the rudiments of comb built upon the bough or other place which they have alighted upon. Those who have seen a tired bee arriving home with a load of honey, will agree that unless the load were reduced by being partly converted into wax, a great number would be lost in their long impetuous flight, and if the swarm arrives at its destination with plates of wax already formed, the urgent task of quickly building comb will be simplified.

QUEEN MATING OVER STOCK.

I wonder how many beekeepers have been successful in getting a queen mated in an upper story above a laying queen? I have asked numbers of beekeepers who have tried it,but have yet to hear of a success, in this country. I have tried it many times, both with ripe cells and virgins, also at the back of a long hive, and with double excluders, but have never yet succeeded. The virgins appear to be accepted all right, but are always missing in a day or two. It appears to be quite successful in the country of the originator, and Frank Pellett says, to be successful, there must be sealed brood present when the queen is ready to lay, but as this is after mating, it does not affect the above question. It has always appealed to me as a great saving of material, especially at a time when bees and brood are scarce. Perhaps some correspondents will give their experiences and methods.

PROLIFICACY OF QUEENS.

A correspondent in a contemporary says that queen breeders pay too much attention to prolificacy, and not enough to honey getting qualities. Whilst it is true that the ultimate aim of beekeeping is honey, it is difficult to see how one can have a queen that is too prolific, if judgment is used to take advantage of that prolificacy by seeing that this virtue is in evidence before the harvest, and by curtailing the queen's powers when the honey is coming in abundantly. That one cannot have a stock too strong when the flow is on, is proved by the success attained by uniting two nearby colonies, when a much bigger surplus is gathered than the total of the two stocks if left upon their own stands. If we follow the example of the late Dr. Miller, and incessantly breed from the stock that has given the biggest surplus, we shall inevitably get greater prolificacy, seeing that the queen must breed heavily to produce a host capable of storing the largest surplus. With this question of honey getting is bound up the one of requeening. The number of eggs a queen may lay in her lifetime has been hazarded by estimating the number of spermatozoa received from the drone, but this is an entirely erroneous guess, from the fact that under the miscroscope, an egg is rarely found to contain a single spermata zoon, the usual number being two or three. This at once cuts down the estimate by one-half or two-thirds, and thus emphasises the need of more frequent requeening, if we are to get the best out of our stocks.

MACDONALD METAL COMB.

The accompanying picture is a photograph of an aluminium comb, well filled with brood. There are six vertical sustaining wires of strong gauge; many users of the Macdonald comb complain that their queens do not oviposit in the cells traversed by these wires. The picture shows that only one wire has been any obstruction to the queen, and even this one was filled with eggs when the photograph was taken, showing that although reluctant to fill these cells at the same time as the others, she has returned to them and utilised them. Given a good queen, and a stock in the right condition, practically all cells should be made use of. It has been stated that the small hole in the bottom of each cell has been placed there purposely, to allow of the comb being more easily cleaned and sterilised. That this is not so may be easily proved by taking the comb apart, and straightening the aluminium ribbon of which it is composed; it will be found that a perfectly straight strip is produced, and that with the available machinery, it is a mechanical impossibility to press the aluminium ribbon into such a shape as to form a perfect cell. This is, however, no drawback to the combs, as the bees readily and quickly fill up these holes with wax. Until they have been thoroughly tested for two or three years, it will not be possible to say whether the bees will winter as well upon these combs as upon wax. Given a populous colony, the question of heat radiation will not matter much, but in a hive weaker in bees, the outside seams will suffer more than on natural comb, as the heat will be conducted to the four sides of the comb, and there dissipated, and this will also militate against brood expansion in spring. I would like to have the Editor's opinion.

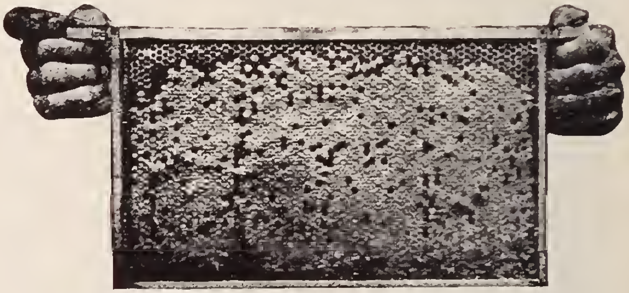

Fig. 27.—A Macdonald Metal Comb (British standard size), well filled with capped and emerging brood.

[Ignoring the years of experimental work at the hands of G. M. Macdonald and his associates, the fact remains that his metal comb has been prominently on the market for three years. We have seen no unfavourable comments on it in regard to wintering. Some adverse comments, especially in relation to early spring breeding, have appeared; but when such comments are examined, they strangely show their writers treating the metal comb as if it were a wax comb and have not the least idea of evolving a new form of management to suit the new appliance. For instance, it is highly desirable in order to achieve a good measure of success to have either insulating hives or detachable insulating walls, the latter for use with single-walled hives. The cost of such insulating walls is comparatively small and their usefulness for wintering purposes is great. As to adverse criticisms from those who have an axe to grind or who find a means for cheap prominence in throwing strones right and left at prominent beekeepers and inventors, well, such "criticisms," which are hardly worthy of the name, carry their origin with them.—Ed.]

Some Experiments on the So-called I. W. and Crawling Diseases of the Honey Bee.

By ARTHUR M. STURGES, B.Sc.

Vice President, Cheshire B.K.A.

During last summer many reports have been received of cases of the so-called I.O.W. disease in Cheshire, the disease appearing chiefly among English, Dutch and "hybrid" bees.

On collecting details of the condition of stocks in which the disease appeared, it was found that practically all cases could be placed in one of two classes:—

1. Stocks which had been queenless, or with a failing queen for a considerable period, and which had been given a prolific queen.
2. Swarms from strong, apparently healthy, stocks.

In nearly all cases the disease showed as soon as brood was being produced in quantity; in some cases as soon as the queens commenced to lay; in other cases delayed for 14 to 21 days.

The symptoms resemble those of I.W. disease, the bees first clustering on the alighting board, and appearing sluggish. Shortly after this crawling commences, and the flying bees have a *harsh wing sound*.[†] Many of the bees have dislocated wings, though some of these are able to fly. Dysentery is not present, and there is no smell. In the evening the majority of the affected bees find their way back to the hive.

Arthur Sturges, Esq., B.Sc.

In many of the cases where the above symptoms have appeared the stocks have been destroyed, but up to date there have been no actual losses of stocks reported from this disease.

During the progress of the disease, brood rearing appears normal, and the young bees hatched from this brood appear healthy.

In order to be able to study this complaint, the conditions of those stocks in which disease has shown itself were artificially reproduced, and careful notes taken of the progress of these stocks.

The stock chosen for the experiment was a very strong one on ten frames, 14in. by 14in., perfectly healthy, and working well in early July when it was dequeened. The bees were of a very well-known English strain of Italians. After being queenless for approximately four weeks, the stock was divided into two portions, one containing the older flying bees and the other the young bees. This was carried out by removing the hive and bees to a new position and placing some of the empty brood combs of the original hive in the old position. The older flying bees returned to the old position and covered seven frames, 14in. by 14in. The young bees on the new stand covered three frames. Both were well provided with their own natural food, in their own combs.

Imported Italian queens of Penna's strain were introduced and commenced to lay within two days.

Both stocks were fed liberally with pure cane sugar syrup, medicated with "Yadil."

The stock of *old* bees[‡] on seven frames commenced crawling very badly as soon as eggs were produced, and this has continued up to date, the maximum effect being reached approximately 14 days after the queen commenced to lay. The stock became greatly lessened in numbers, and 21 days after the queen was introduced, covered four frames and had three sheets of brood, of which two were hatching. Twenty-eight days after the introduction of the queen, the bees cover six frames, and practically all young bees, apparently healthy.

The stock consisting of *young* bees on three frames commenced to show slight symptoms of crawling approximately 14 days after the queen was introduced, but this has not been serious, and passed away.

The stock, three weeks after the introduction of the queen, covers three frames and has two sheets of brood. The symptoms of the disease very much resemble those of I.W.D.:—

Crawling, many of the crawlers returning home in the evening, clustering on alighting board on warm days, general lassitude, dislocated wings, and a harsh wing sound when flying. No signs of dysentery or distended bees has been noticed.

An expert examination of the affected bees has revealed no traces of I.W. or other disease germs, and the complaint cannot, therefore, be attributed to this.

It has been found that *intensive brood production* has caused crawling, previous to the experiments, but the phenomenon of crawling immediately the new queen commenced to lay is rather peculiar, and requires further investigation. [What about the excessive strain of nursing and foraging under *adverse* conditions?—Ed., B. W.]

The fact that crawling commenced before any feeding of brood was necessary disproves of the theory that the trouble is caused by the work of producing the digested food necessary for this, and it would not appear probable that the work entailed by the production of the small amount of food for the queen would cause these serious symptoms. [What about associated factors such as insufficient nitrogenous food, confinement, and the like?—Ed., B.W.] The excitement caused by the introduction of a laying queen may have had some effect in this case, but would not apply in those cases of first swarms with old laying queens. Blank experiments were carried out with other stocks, which were kept queenless for eight weeks, but were kept constantly supplied with combs of eggs, during the whole period of queenlessness.

In these cases no crawling was produced by the introduction of laying queens.

The evidence in these cases may be purely negative, as the bees were of another strain, Penna's Italian + "hybrid" drone.

There is another point, of rather vital importance, which has been noted in connection with this investigation. Though the crawling symptoms have been found to occur with nearly all varieties of bee, it is far more violent with some strains than with others.

Taking these strains in order, it was found that the British Black, or strains containing a large proportion of this blood, were the most seriously affected. The "Hybrid" Dutch bees come next, and are followed by the Italian hybrids, which show very slight symptoms in many cases.

The imported Dutch bee appears to be affected to a very slight extent, and no case has been reported of pure Italians, whether of Italian origin or crossed with Italian strains imported from America. These strains appear to be practically immune. If a similar immunity to the true I.W. disease exists—and evidently the complaints are very closely related, at least in chief symptoms—it would naturally follow that the adoption of these strains will do much in eradicating the disease in this country.

The *conclusions* to be drawn from these experiments are: (1) That a prolonged period of queenlessness must be avoided, and if this is not possible, the queenless stocks provided with eggs from others. (2) That indiscriminate swarming must be prevented by the adoption of more rational methods of beekeeping. (3) That the complaint described is not true I.W. disease, and that where I.W. disease is reported, it is probable that it is not present, in those cases where the conditions described obtain. (4) That certain strains are practically immune from the complaint, notably the pure imported Italians, or those crossed with American strains, and these strains should therefore be adopted in order to avoid this and other similar complaints.

[†] See the B.B.J., 1919, p. 192.

[‡] THE BEE WORLD, August, 1919, p. 43.

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The Ethics of Beekeeping.

By the REV. W. HENRY RICHARDSON.

The standards of a craft so beautiful should be so high that a contribution under this heading might be well declared much out of date. But the fact remains that the ethical aspect is too often ignored; and some within our ranks need reminding that there is a code of honour which, respected, will make our science great; but, ignored, will rob it of all that attracts the choicest spirits. Now I am not anxious to preach a sermon or lecture my comrades on what I trust will become one of the greatest and happiest brotherhoods on earth, but I do want to call attention to one or two points which seriously affect our dignity.

It has come to my notice that some members of our fraternity are woefully ignorant when describing wares, or they wilfully *mislead* unwary speculators in bees and equipment. The former can be readily forgiven, but the one who brings discredit on a business which should be characterised by transparent honesty is not of the same order. We have no room in our community for any trade trickery, and every member of this profession should have clean hands. What an example has been given us by the "Egyptian Beekeeping Establishment," to whom we were introduced a year ago by the BEE WORLD. In despatching bees to this country, our friends experienced a loss of 100 per cent. through abnormal mailing difficulties. Our bees and queens, true to description, came to hand dead. But, even where no guarantee was given, the "Egyptian Beekeeping Establishment" refunded the full amounts paid without deduction for expense of package, commission, or postage. We applaud such honour, and such gentlemen should stand very high in our esteem. Equally highly could one speak of Messrs. Adminson, Ltd., and other outstanding breeders in this and other countries. But some have crept in who are "on the make"—exploiting the ignorance of the novice—and who in some cases do not only fail to deliver the stuff as per description, but also to tender apologies or reply to complaints. The novice should seek the advice of an expert lest unwittingly he does injury by a transaction unworthy of his character; the other man should take a serious course in ethics.

Then, to be very plain in language, there is still *a bee thief*. In many places I have encountered him. When unmasked he deserves severest censure, and a second crime should warrant the erasure of his name from any of our associations or bee clubs. I refer to the man who intentionally leaves an empty hive attractively baited to trap some neighbour's swarm. It is fairly well established, I think, that bees will seek out a possible home. They will attend in large numbers for days before migration, cleaning out every cell, they will leave things looking spick-and-span, and then, having decided their destination, little chance is given for an owner to hive and settle his property. The reason some swarms settle so brief a time near their old home may be that their new habitation has been definitely chosen. Is it right to expedite a neighbour's loss and thereby enrich oneself? To the conscience of an honest man it should be as unthinkable as purloining the produce of an orchard. It is not playing the game; it is out of harmony with the moral sense.

And what shall we say of the man who leaves exposed *the home of death?* I am convinced that but for the disreputable practice of tolerating open hives in apiaries in which bees have succumbed to disease apiculture would have been in a much more flourishing condition. It is true that negligence in this matter is not always culpable, but there are numbers of cases which should not be labelled as less than a criminal offence. The danger in these cases may not be so great in relation to I.W.D. as it was to Foul Brood (much depends on how I.W.D. develops and spreads), but it is grave enough. Now, is it ethical to do less than make every disused hive bee proof, aid then, at the earliest opportunity, make sure that the last germs of disease have received their quietus by free use of germicides or other destructive agents?

But just one other word, and not by any means the least important. Ethics have surely a place when the beekeeper enters the realm of literature and when he has the high privilege of exerting the power and influence of the pen. Now, discourtesy, rudeness, and vitriolic vituperation are anti-ethical and stand heavily condemned by the great majority who support the bee Press. A pleasing feature of the BEE WORLD has been the almost total absence of this spirit, and one would venture to suggest that correspondence which is abusive and unmannerly, the spirit of which has defiled the pages of some other journals, if it ever comes to hand, should be relegated to the waste paper basket or returned for recasting in a more chivalrous mould. There is nothing that tends to retard the fresh contributor so much as the snub of the older writers. Some of us are not concerned about tho insulting critic for our own sake. We know his measure and his worth. What we are anxious for is a fair chance for the new man. We should encourage and not deter by uncharitable reception. It has come to the knowledge of the writer that contributors of promise, whole-hearted students, have been disappointed, disgusted, and discouraged by the attitude of some who came to the limelight in an earlier day. The critic should remember the possible fallibility of himself, that, although for long years he has been associated with beekeeping, a new hand, with greater opportunity for practice, study, and research, and possibly a greater genius for the task, may outstrip him and become his teacher. And, if so, jealousy is neither justifiable nor moral. What we are aiming at is education and real intellectual advance in our pursuit, and unworthy is the man who puts a spoke in the wheel of progress by forgetting to be courteous. Let us make it possible for the timid, who may prove himself a genius, to take his humble place to-day and reach his fame to-morrow. Our aim is high; it can never be too high. We shall call forth the best from others and reach the best ourselves by the spirit of gracious comradeship.

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"A Lance for the Fair Italian."*

By CAPT. (Retd.) EGON ROTTER, Hohenelbe, Czecko-Slovakia.

(All rights reserved.)

When the Italian bee first reached Germany in 1852, this was regarded in bee-keeping circles as an event of far-reaching import. All eyes were turned eagerly on Pastor Dzierzon, of Carlsmarkt, the fortunate possessor of this race. And they were not disappointed; for in the following year Dzierzon was ablo to announce that he had succeeded in acclimatising and breeding a pure strain of the beautiful Italian, and that the original stock had already become a splendid colony. All beekeepers, whether beginners or old hands, whether they kept bees on a large or small scale, now rushed to Italianise their stocks, so that the whole beekeeping world seemed as if seized with a fever-paroxysm.

And now for the crucial question: What means did they use to reach their goal? In the first place, each aimed at getting a pure-bred queen to breed from. Having secured her, the colony was increased by forming nuclei—since *rational queen-rearing* was not then known. Either the valuable stock was divided into nuclei, or else another strong stock was made into nuclei, and given brood for queen rearing from the former. But instead of making the nuclei as like full colonies as possible—seeing that they were of suitable strength, and contained, as far as possible, bees of all ages—in the formation of many of them the wish prevailed to be as sparing of bees as possible; so that the stock was regularly

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* Translated from the original article in "Der Deutsche Imker aus Bohmen," March, 1919, by Miss Annie D. Betts.

"vivisected." If the results fell short of the aim, need we wonder! In these *miniature stocks* the queen-larvae were insufficiently fed, thus *weakened and degenerate* queens were reared, whose efficiency was considerably reduced. The fact was also left entirely out of account, that bees, when made queenless, in their desire to get a new queen as soon as possible, scamp the first-formed queen-cells, so that from these mere *makeshift queens* issue. Instead of intervening and destroying the first royal cradles, things were allowed to take their course. Thus it came about that usually the first-hatched queen, standing on her right of primogeniture, made away with her expected rivals, and thus destroyed all the cells, among which were the last-formed—which would have yielded the strongest and best queens, owing to the larvae having been properly fed. Further, it must not go unobserved that in those days they usually bred *for colour alone*, and left *working capacity* altogether out of account. I consider Dzierzon's "*diamond rule*" a further cause of evil; for by this the queens of the stock colonies were temporarily hindered in their egg-laying before the commencement of the main honey-flow, by being confined in a queen-cage. Hereby degeneration was caused unconsciously, since the fecundity of the queen was hereditarily reduced. Queens reared by Dzierzon a few generations later were indeed very beautiful—as if cut out of pure gold, with a bluish shimmer—thus far surpassing in colour the original specimens; but it was not unjustly said of them that they were spiritless, and stalked gravely about the combs like venerable marchionesses.

Fig.28.—Two views of Mr. Egon Rotter's Apiary.
Inset: Mr. Rotter.

Far from acknowledging that the fault was their own, people thought to cloak and explain away their ignorance by declaring that we had been mistaken in the qualities of the Italian bee.

The breeding of the *German bee* was now taken up, and I would specially remark here that the principles of breeding now gradually underwent a complete change, and were guided into practicable ways. Thus it was possible to attain great cultural results with this race, especially in the German cantons of Switzerland, where rational queen-rearing was perfected. Unfortunately, breeding was carried on in a quite one-sided way, as has been noted; the yellow bee was unjustly condemned and only the black northern bee considered of value. In this a gross injustice was done; for apiarian science has to thank the Italian bee for much of its knowledge, and (if only on that ground) she should not be pushed on one side as a sort of Cinderella. Besides, the commercial value of this race is beyond question. The Italian is really a splendid honey-gathering race, and is still valued as such to-day by old, unbiassed practical beekeepers. Why are the qualities of this race so good? As early as in Roman times honey was much sought after, and was constantly present on every patrician's table. Naturally every effort was made to improve and increase bee-culture. Probably the Romans brought back great numbers of stocks of other races from their military expeditions; so that in this way new blood (mainly Oriental) was brought into the native race. This, in the course of two thousand years, equalised itself, and produced the present valuable qualities of the Italian bee.

In consequence of the above, the variability of the Italian bee is still considerable. Thus by mating the brightest-coloured individuals it is possible to attain an increased glitter and yellowness of the abdomen of the princesses of the third or fourth generation, as also a brighter-coloured scutellum. In this way, through continued strict selection of the parent bees, the *Golden Bee* arose, famed everywhere for its beauty.

The disadvantages of the Italian race as compared with the German bee (earlier brood-rearing and consequent unseasonable flying and loss of bees in spring, as also the early ceasing of the queen to lay in autumn) are counter-balanced by the greater fecundity of the queen and the greater industry of the workers; the early cessation to lay can be entirely prevented by stimulative feeding by the beekeeper at the right time.

Thus, without wishing to detract from the reputation of the German bee, every impartial judge must allow that full recognition is due to the Italian bee also.

Beekeeping in Switzerland.

By R. SCHALL.

The flora of Switzerland north of the Alps are rather unfavourable to beekeeping. There are no waste lands, no moors, no districts with heather or buckwheat; almost every square yard of soil, on which anything will grow, is being cultivated as pasture, or for potatoes, wheat, vegetables, and, in a few sheltered parts, also for wine. Clover is, compared with other countries, seldom grown.

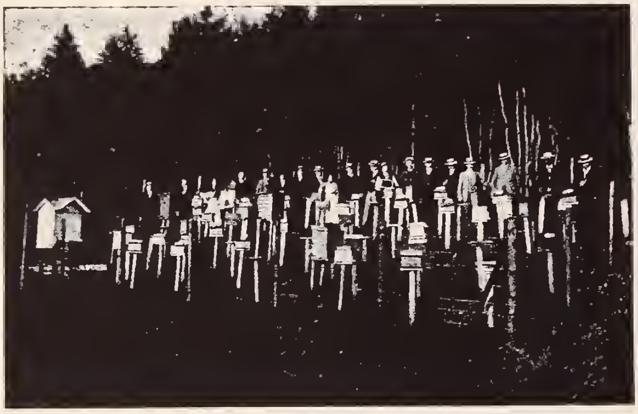
The bees are dependent on the meadow flowers, the blossoms of the fruit trees and berries, on white clover, the weeds, etc. Only pines and some other forest trees provide, under peculiar weather conditions, a rich honey flow; but these conditions turn up only about once in every four years. In the low lying districts the honey flow comes practically to an end by the middle of July; in the districts 2,500 to 5,000 feet above sea level, it lasts longer; but in these parts the winters are very long. The average harvest of surplus honey, good and bad years, strong and weak colonies reckoned together, is probably only about 10 lbs. per hive, but *these unfavourable conditions have induced, or compelled, the Swiss beekeepers to make more strenuous efforts to improve the bee races than have been attempted anywhere else.*

Some fifty years ago, Italian, Carniolan and other queens were imported, and the first impressions were favourable. Their fertility appeared greater than that of the native brown black bees, and when the weather in spring was favourable, they brought good harvests. They had, however, a greater tendency to swarming, and as all these imported queens came from more southerly countries, with shorter winters, they started breeding earlier than the native queens. This had the disadvantage, that when cold winds set in in March, the bees fetching water and pollen perished frequently by the thousands in a couple of hours, and colonies were frequently reduced so far that they could not recover any more a useful strength during the next three months, and brought no harvest whatever.

Careful comparison during 15 or 20 years has shown that the native bees brought a better *average* than either pure Italian, etc., or crosses. This is certainly not surprising; they have adapted themselves during thousands of years to the local climatic conditions, and the fittest have survived, *i.e.*, those which start breeding at a time when spells of cold winds are not likely to do any more such great damage, which have only a moderate fertility and in consequence less swarming tendencies than the southerly races, which, owing to better climatic conditions, can indulge in such pastimes with impunity.

Some 35 years ago the first attempts to *improve the native bees* began by carefully selecting the fittest, by accepting swarms and breeding queens only from the best colonies; this is, of course, being done in other countries, too, but the Swiss have gone an important step further. As the qualities of the offspring depends as much on the paternal as on the maternal influence, they have made arrangements that *the queens can be fertilised only by drones from a selected good colony.* To make this possible, a colony which has brought the best average honey harvest during the last three to six years is chosen. In April, two frames with starting strips of foundations are inserted near the brood nest, the cells built in these frames are almost entirely drone cells. By the end of April or the beginning of May this hive is brought to a carefully selected spot, usually in a forest, which must be removed all round at least 3½ miles from other beehives. In Switzerland, with its deeply cut valleys and numerous forests, such spots are yet more easily to be found than in many other countries. This "drone colony" remains at the "*mating station*" till about the end of July, and is given in charge of a teacher, or a forest official, or a competent peasant in the neighbourhood.

Between the beginning of May and the middle of June, another colony is selected to supply the eggs or larvae from which the queens are to be reared. This colony must show a good record about the average honey harvest, a compact brood nest, little tendency to swarming, must have a queen at least two years old. If there is a colony fulfilling the other conditions with a queen which is three years old, it will be preferred, because it is likely that the descendants will have greater longevity. The queen must be nearly black, as experience has shown that queens of this colour give the best results; and, if possible, the colony should also be of a peaceful temperament. Cells with eggs, or larvae which are not more than 6, at the utmost 12 hours old, are taken from this colony and transferred to a "Nursing Colony," which has to rear the queens. Great stress is laid on the necessity, that this colony should be in a suitable "frame of mind" to perform this duty efficiently. It must be strong and healthy, and *must have the swarming fever;* unless this is the case, there would be no nurse bees ready to supply the "royal" jelly *at once*, when the larvae are introduced, and the queens would not reach the full vigour which is attained by queens produced by natural swarms. If the colony intended for the duties of the wet nurse makes no attempt to build queen cells, it is being coaxed by feeding. The queen is then removed; 8 days afterwards the queen cells are cut out, and the eggs or larvae are inserted in the brood nest of the nursing colony.



By Courtesy of the "Swiss Bee Journal."

Fig. 29.—A Swiss Mating Station.

Shortly before the queens are ripe to leave the cells, the latter are cut out carefully, and are inserted either in little cages, or transferred at once in small hives measuring about only 10in. in length, 5in. in width, and 6in. in depth. These are large enough for 3 small combs, about 8 ozs. of bees, and 12 ozs. of candied honey. They are provided with an alighting board. These "boxes for fertilisation" are filled with the stores of candied honey, 8 ozs. of bees without drones, the cell with the ripe queen is fastened to a peg which is introduced through an opening in the lid, and the box is then sent by parcel post or otherwise to the nearest mating station. It is examined carefully by the attendant to make sure that there are no drones in it, and is then placed on a wooden stand or suspended from a tree, etc., in the neighbourhood of the "drone colony." After about 12 days the combs are examined, and if the queen has begun laying eggs, the little hive is returned to the owner. About 80 per cent. of the queens sent to the mating stations are successfully fertilised. There are occasionally as many as 50 of these small hives simultaneously at the same mating station.

Every queen thus fertilised is marked with a small drop of white or yellow, etc., colour, and is entered in a pedigree book under a number, a card bearing this number is sent with her, testifying that she has been fertilised by a drone from the selected colony. On the card are printed a number of questions, about fertility, honey, harvest, compactness of the brood cells, colour, activity and healthiness, etc., etc.; the answers to these questions should be filled in by the proprietors of the particular queen during the next 2 to 4 years, and the card should then be returned to the Central Association. By comparing the results, the best strains are found out; they are given names like "Nigra," "Flora," "Martha," etc.; the names and addresses of the most successful breeders are published in the bee journal, and they are officially recognised or "certified" as breeders by the *Central Beekeepers' Association.*

A very great deal of care and trouble is thus being taken to obtain really good queens. It is not possible to produce them wholesale at the rate of some 100 per week, and they are sold at high prices, 15 francs for a queen is the minimum price asked; the most successful breeders ask and get more. But the results obtained with them have been highly satisfactory. Careful statistics show that at the same apiary colonies with pedigree queens bring about three times as much honey as those with ordinary queens living under exactly similar conditions.

This method has now stood the test of about 30 years' experience. In spite of the high price, the demand for these queens is on the increase. In the year 1919 there were no less than 95 mating stations maintained by local branches of the Beekeepers' Association in the German-speaking part of Switzerland, and many thousand queens were sent to them. In addition, private stations are kept by some of the largest breeders. The very ably conducted *Swiss Bee Journal* is devoting about half its space to this subject and the statistics which have reference to it. In the adjoining countries, in the Black Forest, etc., there are now stations conducted on the same lines, to supply good queens to the local Associations, which give them to the most promising beekeepers of their district. Prof. Zander has adopted this method, too, since about 10 years, and reports favourably on it.

Of course, some critics are not wanting. A few enthusiasts have expected and promised too much, and there are impostors who produce "queens" wholesale, without having the knowledge, skill, or will to persevere in the careful selection of the parents, and sell queens not under their own names but under the name of the strain from which they may have descended originally many years ago. This may explain a large percentage of the few failures; others may be due to anatomical defect of individual queens, to superseding, etc. It is, at any rate, wise in Switzerland to buy queens only from the "certified" breeders.

About 40 years ago a beekeeper was not considered "up-to-date" in Switzerland unless he imported Italian and other queens from southern countries, but experience has altered this opinion thoroughly. The persevering efforts to improve the native race of bees by careful selection of the queens and *drones* has given such good results that the import of foreign queens has ceased, though they could be had for less than one-third of the price which has to be paid for good native queens.

The Elimination of "Isle of Wight" Disease by Independent Brood Incubation.

By J. N. KIDD.

"A successful original experiment was carried out in September, 1919, at Stocksfield, Northumberland, in the elimination of the 'Isle of Wight' Disease from a badly diseased stock of bees. The bees were all shaken off their combs and destroyed except the queen; and the combs

containing the unhatched brood (and the queen) were put into a chicken brooder with a continuous temperature of 90 degrees. At the end of a week the hive was lifted out, and it was found to be filled with newly hatched bees, and the queen alive and in good trim. Thus the new generation of bees has never had contact with diseased bees." (The BEE WORLD, December, 1919.)

Before telling of my fight with "Isle of Wight" disease during the 1919 season, permit me to say that the stock saved in September, 1919 (see the BEE WORLD, December, 1919), is still alive, and has never since shown the slightest sign of the "Isle of Wight" disease. The crop from it was a crate of 20 lbs. of clover honey, which is considered good for a poor season. To avoid risk of getting disease again and to keep the experiment clear of complications the owner, Miss Brown, wisely, I think, would not send it to the moors for the heather harvest. There is unfortunately some foul brood in the combs, which if the stock winters safely, will be eradicated this year. We are determined to keep alive our first success.

Beekeepers shook their heads in 1919 and said, "Wait till the winter." Now they say this is only *one* swallow, but I will now show them many more swallows, enough, I hope, to make a "glorious summer."

I commenced the season with ten stocks, spring count. Of these, seven showed the crawling stage of the disease during the course of the year. The stocks were not crawling all together. The first one crawled in April, and the last in September, so that I was able to treat them *seriatim*.

My incubator was improvised out of an old box, and was managed, as to heating, in the same way as a chicken brooder. The temperature for the first few days was maintained at about 90 deg. F. and afterwards 80 deg., or less. The "roaring" made by the fanners is soon a good guide to the necessary heat required. The thermometer was placed on top of a calico quilt which (for ventilating purposes) was the only covering on top of the frames. The entrance of the hive was kept at full width, secured by perforated zinc; no bees are permitted to get out of the hive during incubation.

It seems a hazardous thing to run the queen entirely alone on to brood combs, but I can say, after many incubations, the queen never fails to survive.

The first essential thing is to get every bee off the combs. Bees that hatch during the process of shaking and transference of the combs, and bees that are then biting their cappings, may need to be eliminated, but I do not fuss about them. We do not know that they are infected, and pure conjecture does not convince me.

Seven days in the incubator is usually long enough to provide sufficient hatched bees to keep up a proper hive temperature, but bees, like ourselves, live in a hard world. How soon robber bees (and wasps) find out the weak defence of a stock just out of the incubator. For that reason I now incubate for twelve days. Bees do not fly out to work until they are about that age. I have often given flights from the incubator. A few bees three days old in one lot came out and took a flight. The warmth of the incubator makes things very lively in the hive, and if not too warm the bees appear to be on excellent terms with their environment. *Confinement in the incubator for 12 days seems to fit nicely with their natural habits.*†

When I first started to incubate brood, I expected to lose all eggs and much unsealed brood. I have been surprised. It is a question with me whether there is any loss at all.* Prompt examination of two lots from the incubator, one after ten days and the other after twelve days of incubation, revealed in each case that there was more brood than when the combs were put into the incubator; freshly laid eggs and young unsealed brood, as much as the bees could cover. What exactly happens during the first few days I will leave to beekeepers with observatory hives to tell us, but that the queen starts to lay freely four or five days after being put into the incubator is beyond doubt. That the young just hatched bees take care of and feed the brood under the circumstances is very gratifying. I like plenty of honey and pollen in the combs when I start an incubation and brood on not less than three combs.

With this brood raising in progress water is needed. I put a stock on its permanent stand after ten days' incubation one fine August morning. The first bee that came out flew to some grass and sipped the dew. I at once placed some wet grass on the flight board, and other bees coming out eagerly clustered on the grass to get the moisture. In making my next incubation I gave water by placing a wet rag on top of the front part of the quilt, which was renewed daily.

Beekeepers will think I am a stern man to kill so many bees. Not so I will show how I have tempered judgment with mercy; whether wisely or not, time will show. I was out to learn, and was not bound by any formula. I could not destroy a strong lot of bees straight off; cut them off, as it were, in their prime. I soon modified my plan. I made an artificial swarm, comprising the queen and all the bees and part of the combs. The best combs of brood were then put into the incubator with a spare queen; and whilst the incubation was in progress the "shook" swarm was raising a fresh brood nest. Thus I got much additional brood for successive incubations, and when the time came for destroying the bees (when the crawling became extra bad) I had only a small lot of bees to kill. That very free way of treating I. of W. disease will displease not a few, but I gained some brood, and I have yet to learn that there is a contra to it in the account. This change led to the purchase of some Italian queens which I used in connection with the incubation of brood, for making increase or for changing the queen when I thought a queen was too old.

As a result of these manipulations my ten stocks have been increased to fifteen. I have sold five and am again wintering ten stocks. Increasing from 10 to 15 stocks is nothing great, but compared with my previous practice of destroying "Isle of Wight" disease stocks by fire, it is much more than satisfactory; it is a triumph.

Now for *the behaviour of these incubated stocks.* They stored clover honey in the sections as well as any other "healthy" stocks. They went to the moors and stored heather honey as well as the rest. But what is most gratifying; not one of the incubated lots, twelve my own and two which I incubated for neighbours, have since shown the slightest sign of crawling, or that lack of energy that usually characterises bees troubled with "Isle of Wight" disease. *This can be placed on record: that each of the 14 colonies treated through my incubator during the period 17th April to 8th October have not so far shown any departure from the normal.* Indeed, each has been a uniform unqualified success. There is something in this "uniformity." It indicates that there is no disease carried in the combs (I have in these incubations transferred combs from hive to hive very freely). It indicates (along with Miss Brown's stock incubated in September, 1919) that there is a complete elimination of the disease.

I recklessly sent all my stocks (13) to the moors where they stood very near some diseased stocks.

If I had no neighbour beekeepers and met no disease at the moors, it would be easier to prove whether or not my plan is a sure means of eliminating "Isle of Wight" disease. I cannot alter my environment. I cannot escape the perplexing problem of re-infection, but I will assume when I get a fresh outbreak next year that the cause is re-infection, and continue to incubate not only my own brood combs but the brood combs of my neighbours. It is at last a fair fight; we can now hit I.W.D. not only hard blows, but blows intelligently placed.

◆

Danish Bees.

By H. E, CARTER.

Hon. Sec., N.W.B., Western Division, Kent Beekeepers' Association.

Last season the opportunity occurred of testing bees from Copenhagen.

Early in May three queens were forwarded in travelling cages, each cage being formed from a block of wood 4⅜in. by 1⅜in., hollowed out into two compartments thus:—

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† Confinement for as long as 15 days in an *incubating room* has not been found harmful. See the BEE WORLD, Vol. I , p. 135.

* If *emerging* or rapidly-hatching brood is utilised, the loss of eggs and larvæ will be small, provided the proportion of the former is large, but not otherwise. The loss will, of course, be due to starvation through neglect owing to insufficient nurse bees at the beginning.—ED.

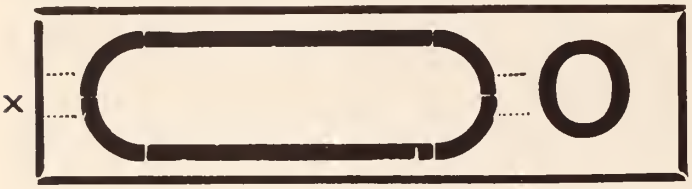

Fig. 30.

the small circular compartment being filled with candy.

The top of each cage is covered with wire cloth, and at the end x is a hole, covered with a piece of tin, for releasing the queen when introducing.

The three queens were introduced, and all commenced laying, and rapidly filled ten combs with eggs, appearing to be going on well. For some unknown reason one of the queens was found dead on the alighting board, about 14 days later. The other two did well, and the bees were up in the section racks storing and capping rapidly. A few nice sections were obtained; but owing to the bad weather, most of the stored honey was used in brood rearing, and even during the bad weather in July, these two stocks were ahead of all the others in the apiary.

The bees much resemble the ordinary English black, though there is a trace of yellow in the first abdominal segment, and the other abdominal hairs are very *gray*. These colourings are regular and do not vary, so that the bees can be considered a *definite variety*, and not simply hybrids.

They fly from the combs more than Italians under manipulation, and are not so easily handled.

It remains to be seen whether they resist disease.

In July a fine frame stock was received in a travelling box.

The *frames* are a trifle larger than the British standard, measuring about 14½ by 8½, and have short ends to the top bar, with an extended bottom bar. The spacing of the frames is obtained by 4 small pieces of wood, one being fixed in each corner of the frame, keeping the frames 1½in. from centre to centre both at the top and bottom. The end spacing is secured by a round headed screw driven into the end bars about 2in. down, and also by the extended bottom bar.

The ventilation of the travelling box appears to be insufficient, six small holes in each end covered with wire cloth being the only air holes.

It is intended to give these bees an exhaustive trial during the coming season under various conditions, and compare results with both Italian and black bees under similar conditions.

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The Production of Good Worker Combs.

By F. M. CLARIDGE.

Member of the Re-Stocking Committee, Essex B.K.A.

Every modern beekeeper knows the value of having good, well-built worker combs, containing as few drone cells as possible; indeed, it would be difficult to put a money value on such combs, whatever their first cost may have been. I have no need to repeat the regularly given advice on the advisability of using full sheets of wired-in worker foundation, for the reasons are so well known and appreciated by the great majority, but unfortunately the results obtained so often fail to come up to the desired standard of perfection that I am constrained to give a few suggestions, which I trust may help readers of the BEE WORLD to obtain some improvement.

It often happens that the bees leave a space at the edges of the comb from about half-way down the frame to the bottom, and also a big gap along the bottom, which being entirely unoccupied by comb, is just that much room wasted, and when we consider that there are approximately about 28 worker cells on each side of one square inch of comb, making 56 cells all told, it is at once apparent that a very large amount of brood is lost in the total number of combs in the hive. If we can persuade the bees to fill up this vacant space, we shall be gainers by so many extra bees to forage for us, not to mention the extra facility afforded in the finding of the queen, as she will have fewer nooks and corners in which to play hide and seek.

To obtain this desirable state of affairs, I have found it necessary to give some careful attention to several small details, none of which are very important in themselves, but taken altogether they make a considerable difference.

The first is the frame itself and the manner of assembling and wiring it. A good strong frame, cut to fit accurately, so that when nailed up it will hang quite square, both perpendicularly and laterally, is essential. You cannot expect straight level combs from frames which sag, or hang so as to allow the bottom-bars to touch their neighbours on one side and leave an inch space between the other; and this can be avoided by nailing up the frames in a properly constructed block, testing each one on its removal for truth, and "sighting" along the side bars to see that they are parallel. Even all these precautions may be nullified if the metal ends used are faulty, so be careful to purchase only good ones. A very simple way to test the finished frames is to turn the brood box over after putting them in it with the metal ends fitted, and observe if the spaces between the bottom-bars are fairly regular.

When wiring the frames, do not use hooks, but pierce the side-bars and thread the wires through them; do not hook the wires over each other, and use at least four strands across, the first at about 1in. below the top-bar and finish off each end on a small tack driven in with a pair of pliers. The holes should be bored before assembling the frames. The wires should be of fairly stout gauge, about 28 gauge will do, and stretched before use.

The next thing is the *foundation*, which must be of good make, free from adulterants, and preferably of "Medium" thickness. This is a very important matter, as often the bees will refuse foundation from no apparent cause, and if they do eventually build it out, they will superimpose drone cells upon the embossed worker bases. I have seen this happen many times, and like to have my foundation smelling as fresh as possible, sometimes going to the trouble of washing it with warm sweetened water, which I find makes it more attractive to them, the reason probably being that some slight smell of the soapy solution used in milling still clings to the wax, and the washing removes this, and the water being warm, freshens up the aroma of the wax. When embedding the wires; the greatest care must be taken not to make any holes in the sheet, for the bees will often enlarge these and fill up with drone cells. For this reason, the wires should not have any joins, nor should they be crossed over each other. The foundation should be cut a good fit right out to

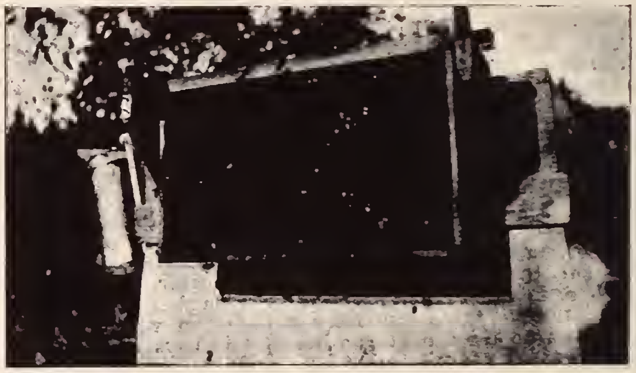

Fig. 31.—A practically perfect comb, almost totally composed of worker cells, and with no holes through it.

the side-bars, and come to about 1in. from the bottom, the remaining space being filled up with a "bottom starter," which is a strip cut about 1in. wide, and fitted in a groove along the bottom bar, thus leaving a space of about ⅛in. between the two edges. The bottom starter is fixed by means of molten wax, a method which I prefer to any other style of fixing foundation. If the edges are also waxed to the side bars, so much the better, and a correspondingly stronger comb will result.

Now, having prepared our frames, the next thing to consider is *how to get the bees to build them all out into good combs* such as we desire. This is accomplished more readily by experience than from following any set advice, and the conditions under which they will do the best work may vary with the locality; but as a rule they will do well when honey is coming in fast, and they are at the same time extending the brood nest. One very important thing to bear in mind when inserting fresh sheets is to always place them in between combs which are sealed over, if containing only honey, or else between combs which contain only brood, remembering not to divide brood combs which the bees can only just cover properly, or your aims will be defeated, and much harm done to the colony. If you care to go to the trouble of shaking the bees from all combs but two, and inserting the fresh frames, one at a time between these two, and at the same time feed heavily with thin syrup, you will obtain such combs of brood as will make you proud of the trouble taken. This is the method described in *Simmins' Modern Bee Farm*, under the heading of "plumping," but it is rather wasteful of bee life, as the combs are removed as soon as they are filled with eggs or young larvae, and the balance of nurse bees is not properly maintained. Another way to get them built right out, is to utilise them as honey supers, using an excluder, but there must be a heavy flow or the deep frames will not be so well built as would shallower ones. The drawback to this method is that when filled with honey, the comb being new and tender, is liable to stretch, thus making the top rows of cells useless for brood rearing when the combs are brought to that purpose.

A method which had some advocates years ago, was used in the United States and was called "*Reversing*" and, as the name implies, it consisted of reversing, or "inverting," the frame, so that the bottom bar was put to the top, with the idea that the bees would then fill up the space which was at the bottom. In practice, it was found that they would sometimes do this and sometimes they would leave it as before. In experiments which I have carried out, I proved these facts for myself, and ultimately decided it was not worth the trouble with the equipment which I have got. There were hives made specially to enable this operation to be carried out, but they have dropped out of use, probably not so much on account of the failure of the principle, as because the frames were not made large enough to accommodate a good prolific queen.

There are several other things which may have a bearing upon the subject, as putting the bees into such a frame of mind that they will naturally be inclined to fill up the frame to its fullest extent. One of these is that of having *plenty of room below the frame bottom-bar*. All my later hives have a very deep entrance out in the floor, or rather the entrance is sloped up from the front so as to allow about 1¼in. depth entrance, gradually rising to near the rear of the floor. Visitors often ask if the bees do not build comb there, but I have never found them do it, and I think this extra space underneath helps to induce them to extend the comb as deep as the frame will allow. I also believe that the action of the queen may have something to do with this, as I think she very rarely likes to go on to the floor, or get very far away from a good cluster of young bees, which she would have to do if every comb were built right down, and only the usual ⅜in. space allowed at the floor; consequently, I think it feasible to presume that bees will gnaw a passage for her where otherwise they would build a complete comb. One peculiar thing I have often noticed is that they will not extend old tough combs very readily downwards, and to obtain such good combs as we are trying to get, we must use fresh foundation, getting them built out as quickly as possible. Sometimes *old combs* can be utilised by paring off the bad corners, and fitting in some pieces of foundation, but this is a patched up job at the best.

The chief thing to bear in mind is that the combs must be *continually* worked, even if the rate of progress is not very fast, because any stoppage will generally mar the evenness of the combs, but I like to get them built rapidly if possible. Like all good things, effort is necessary to obtain, but in the end the trouble is decidedly worth while. The career of the **BEE WORLD** itself should be highly inspiring to its readers towards such idealism in beekeeping practice.

Bee Culture in Ireland.

By S. CRAWFORD.

The 1920 season was one of the most disastrous for bees and beekeeping in Ireland for many years.

The losses from starvation were enormous. My own losses were very high; no sugar for feeding could be got until about the middle of May. Three of my apiaries situated in heather districts gave a few good sections and stored enough for the winter, but those of my apiaries in the inlands did very badly, and but a few gave a little surplus, but nearly all had to be fed up for the winter.

In feeding I make all my syrup with *cold* water in a large tank. I generally select a few strong stocks and give them plenty of frames and feed them up to get a quantity of filled combs to transfer to weak stocks. Such stocks do not seal up their stores as well as strong ones. Consequently a lot of them suffer from dysentery and dwindle away in the Spring. My hives consist mostly of plain body boxes (holding 11 and some 12 British standard frames) with no legs and with a telescoping outer cover. Supers are made same size as body boxes. I also use a lot of 16in. by 10in. frame hives. These do well here and need less attention as regards feeding, building up in Spring and swarming, and always winter well.

Has anybody in this country experimented with *keeping royal jelly*? I have grafted the past season with royal jelly one year old, and the bees took to the cells just as well as with the fresh jelly. I store it up in small bottles, corked tightly, and wrap the bottles in waxed paper and keep in a cool place.

Sugar as bee food seems to be coming in for a great deal of criticism lately. In my experience, when *part* of the winter food is made up from good sugar given in time to be well sealed before winter, no harm will follow. Years ago when driving lots of bees from straw skeps, they were always fed up on sugar syrup, and always wintered well and did all right during the summer; but when one has good combs of honey, I do not think it would be wise to extract it and feed the bees on sugar. It is not only a question of safe wintering that we have to consider but also the ultimate effect of the winter diet on the stamina of the bees.

No case of Malignant Dysentery has appeared in my districts (Co. Tyrone) as far as I know. I think the north of Ireland is free from this infectious disease. Brood diseases, on the other hand, are prevalent among amateur beekeepers, who do not take a real interest in beekeeping. A lot of them leave the infected unpopulated hives standing about to catch swarms, and of course robber bees clean out the honey and spread the infection. We have a good *honey flow* here from fruit blossoms and sycamore, with whitthorne and willow. The second flow comes from white clover and wild raspberry, and a late one from ragweed, blackberry and heather.

Our chief enemies that still rob Irish beekeepers of much of their achievements are: (1) bee infections; (2) insufficient education and lack of proper interest amongst novices; (3) the changeable weather. Until the first two groups of enemies are controlled, progress in the real sense of the word is impossible.

The American Type of Hives.

By T. I. ROBINSON.

The impression gathered from several interesting letters from readers in reference to my two letters on interchangeable hive parts which appeared in the BEE WORLD, suggests that a brief supplementary contribution on this subject matter may be helpful.

One correspondent suggests that all hives should be of ⅞in. material and square.

There is no doubt that most British single walled hives are made of too thin material, partly due no doubt to the fact that a light weight hive is asked for by commercial beekeepers in general apart from those who practise migratory beekeeping.

By designing a hive for ⅞in. thickness, one inch boards planed both sides can be used, and it is not necessary to have the board wide enough to make the full depth of the brood box.

A wide board always has a tendency to warp, no matter how well seasoned it may be. If a good joint is made with *fish glue*, which withstands the weather better than ordinary glue, no trouble will be experienced if the joints are not in a line round the hive.

The corners of a hive should be either dovetailed or corner locked, the latter being simpler for machinery. A square hive is undoubtedly an advantage. It allows the beekeeper to suit himself in the placing of the frames, apart from other obvious advantages. I previously suggested a rebate as a location for the supers of any single-walled hive of the American type.

T. I. ROBINSON, Esq.

In the chapter on hives in the *A B C and X Y Z of Bee Culture*, A. I. Root, in giving his account of the evolution of the Root hive, mentions that he built hives with a rebate, but found that, due to propolisation by the bees, these were often split off. He also tried sloping the joints, but eventually adopted the flat surface joint which has been successfully used for a considerable number of years now, at least under American and Colonial conditions.

Where equipment receives a certain amount of over-hauling this is simple and effective, but having seen gaps of ⅛ inch in the joints of built-up supers due to timber shrinkage, which the bees waste their time in filling with propolis, I am inclined to think that unless the faces of the joints can be kept level some other arrangement is to be preferred for this country.

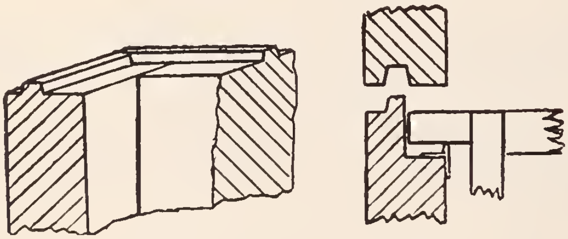

Fig. 32. Fig. 33.
Taper Tongue and Groove method of making joint.

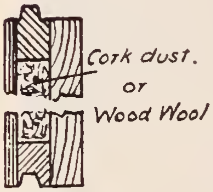

Fig. 34.
Section of Hollow Wall.

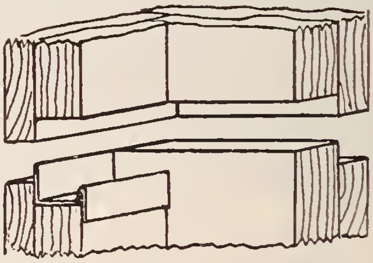

Fig. 35.
Two piece wall, with rebate, and extended metal runner.

For making a positive location and weather check, the method shown in the sketches is simple, and not expensive when done in quantity. The tongue and groove are made taper to give more latitude in placing the parts together; and at the sides where the rabbet for the frames is made the tongue will be made with the inside straight as shown. The tongue should not be more than ⅛ inch or 3/16 inch high, and need not be more than 3/16 inch wide, the groove should be made 1/16 inch wider and deeper than the tongue to allow the super to seat itself.

For those who make their own hives and require the thickness of the single wall body, but want lightness, the following construction, while entailing a large amount of work, is very effective.

The walls are made hollow by taking ⅜ inch or ½ inch board for the outside, and three-ply board for the inside walling, the space inside can be filled with cork dust or wood wool, and the top and bottom distance pieces can contain the tongue and groove respectively.

The space should be cleated in two or three places, according to the size of the brood box, to prevent the three-ply wood buckling.

This method, however, requires great care in making up, and is *not* a commercial proposition by any means.

If any person has a preference for a rebate round the top and bottom of the boxes, the way *to prevent the splitting off* previously referred to, is to make the walls of two thin boards, say ⅜ inch for inside, and ½ inch for outside, the grain of the wood running vertically inside and longitudinally outside. Thus we have end grain on the rebate which is formed, which cannot split off, and the walls of the hive are correspondingly stiffer, particularly if they are cemented together with some tarry or other preservative preparation.

Where a rebate is left for the frame ends and this construction is followed, a special runner is used to complete the check all round. This is shown in sketches. The same effect can be produced by fixing a slip of tin, the length of the side, in the groove, standing out the desired height.

It is hoped that these notes will prove of some use to those who are interested in the single-walled hive of the American type, and the writer will be pleased to hear of any trial of any of the above suggestions.

The Humours of Beedom.

By the Rev. E. F. HEMMING.

President, Huntingdonshire B.K.A.

Some years ago I was asked to prepare a programme for a garden party, and as the said party was being held for a charitable object the committee suggested that it would be a good thing if I would solicit advertisements for the pages of the programme, and thus not only pay for the printing but bring in an additional sum to the funds. With some nervous hesitation I consented. Gathering together the official material for the programme I consulted the printers, who informed me that this would take up about ten pages. I thereupon decided to get ten pages of advertisements—a page of advertisements to face a page of programme matter. Soliciting advertisements was not in my line, but I determined to do my best, and marking off each blank page into four parts and the price for advertising in each quarter-page being fixed, I sallied forth on my business undertaking. Arriving outside a grocer's shop my nervousness became acute. I walked to and fro before the windows some half-dozen times, studied every article in the windows while waiting for courage to enter and beard the proprietor. This courage was a long time coming, and not until it dawned upon me that I had been hanging about that shop front long enough to be arrested for loitering, and if I was going to repeat the process before each shop I wished to enter, my programme wouldn't be ready by Christmas, and it was now July, did I take courage in both hands and enter, and stammeringly ask for the proprietor or manager. A smiling assistant took my card into the office, and within a few seconds bade me "step this way." With many apologies for troubling so busy a man, I stated my business, but not daring to suggest he booked more than a quarter page. "Um," said Mr. Grocer, "quarter page? Not very dignified for a firm of such standing, what are you asking for a full page?" Rebuked and delighted, I stated the price. "Book me two pages," he said. "I have some delicate fruits arriving soon—good chance to bring them before the élite" I thanked him, and sallied forth and burst into a fishmonger's without hesitation. "Book me half a page, anywhere except the inside of the cover," said the man of fish. A draper asked for the whole of the back cover, and so on, and in a short time my space was filled. Alas! My troubles were not over. First post next day two other grocers wrote asking me to call and see them. I went. They both demanded space in the programme. "Sorry," I said, "full up." "Hardly fair," said Mr. X, "to give Mr. G. a space and not me." I rushed to the printer, who suggested that I spread the programme matter about, and increased the size to thirty pages. I did; but this didn't suffice. Advertisements unsought came rolling in, and even when the whole matter was in the printer's hands several applications for space were received. Not willing to lose a cent, I worried the printer once more. "Only thing to do," said he, "is to print the official matter in very small type, and cramp it into one-quarter page space." The programmes were printed at last, and the day of the garden party arrived, and the programmes were freely distributed. During the afternoon I saw a friend sitting on sloping grass and pensively gazing at the programme with a magnifying glass. "What on earth are you doing?" I asked. "Trying to find the programme matter," said he; "never saw such a sell, all advertisements." I laughed, and he groaned, and, believe me, 'twas only with difficulty that I, the editor of the thing, could point out which was not advertising matter.

In the bee world I verily believe there are some people who would like to see our periodicals descend to this. A few bald technical facts about bees, and the rest of the space given over to those who wished to advertise. Some of the grumblers would like also to advertise gratis in a pseudo-literary manner and would condemn the unfortunate editor who would not hail such a virtue. . . . Methods of advertising vary. I remember picking up a poultry paper published not a thousand miles from New York. Advertisements were everywhere, and here and there one would catch sight of an article such as "Egg Production in Winter." A good column of fairly instructive matter, and then the shock—the whole thing was an advertisement for some poultry spice. Alas! if we descend to this.

Other humorous people are those who delight to be at cross purposes with everyone else. One thinks of interesting individuals who write you on smooth, ivory paper, headed with type printed in purple and yellow:— *W. R., Bee Master, the original and only true authority on bees, originator of the famous* * * * queens. That one hasn't heard of these * * * queens is proof of one's ignorance. Write to one of these great men and you are advised to ignore the opinions of the celebrated and practical bee men of to-day. "Put yourself in my hands, and I will supply you with bees that never rest, proof against disease, and my appliances are unsurpassed."

Again, there are bee men who advocate frames of a different shape and size from those used by practical men of to-day. "Standard frame, ugh! Try frames 24 x 18." Did we but standardize frames 2 ft. by one and a half, these large frame advocates would bid for 30 by 22.

Then what of our cousins across the mackerel pool? They do not like to be outdone, and I can imagine them adopting sheep hurdles as the ideal frame, and as for metal combs, well, wouldn't wire netting stretched over the hurdle do equally well?

Then there are bee men who know so much that we contract into our shells in their presence, and yet when you ask them to give a lecture on bee-keeping they can't bother, or haven't time. Any excuse rather than betray their ignorance. Sometimes, however, these humorous individuals do launch forth, as instance the learned gentleman who wrote that intelligent article printed in many school books, in which we are informed that bees collect wax from flowers and carry it to the hive on their hind legs.

The joy of bee-keeping is not £ s. d. One loves the little insects for what they are and what they do. They love flowers, so should we; they love work, so should we; they love order, so should we; they love cleanliness, so should we; and since all this is so may we never use the delicate winged creatures merely as an excuse for advertising, and may THE BEE WORLD and its sister periodicals ever open their pages to all the joys that soulful bee-keeping brings in its train.

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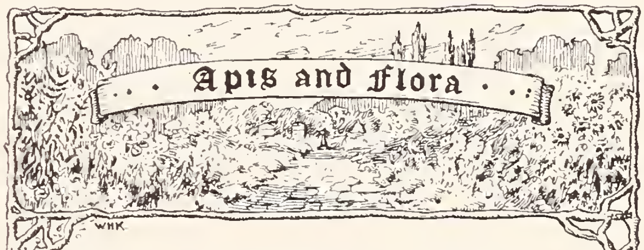

Even bees, the little alms-men of spring bowers,
Know there is richest juice in poison-flowers.
—KEATS.

A Useful Weed.

By A. F. HARWOOD.

Some time since, in reviewing Mr. Pelletts' *American Honey Plants*, I had occasion to say that various forage plants of the U.S.A. would be worth introducing for trial here.

Before dealing with certain of these, however, it may be well to examine more carefully some of the subjects which, while occurring in North America, are not peculiar to that continent.

Of these, perhaps one of the most widely distributed and valuable is the Willow Herb, *epilobium angustifolium*, known in the U.S. and Canada by various names such as fireweed, rose bay, etc.

Lieut. Bowen, of Cheltenham, a well-known Cotswold apiarist, has been offering roots of this plant in the advertisement columns of the *British Bee Journal*, and I trust that the response has been gratifying.

Many years ago, Mr. Desmond, curiously enough another Cotswold beeman, when writing nature notes in the *Daily News*, drew attention to the invasion of the sites of the demolished buildings north of the Strand by the willow herb. I went to see the display and was struck by the number of bees that could be seen working on the showy flowers. Returning *via* Temple Station, I saw a bed, evidently self-sown, inside the railings there, and on these, too, bees were working freely.

There are few situations that require alleviation more than a daily journey on the District Railway to and from the City. Westward from Hammersmith, however, there is just a little relief obtainable by observation of the trees and shrubs visible from one's place of torment. In July, the banks are clothed in long stretching bands of pink on the south side, while on the north isolated clumps of the same colour point to the wind-borne seeds having brought up against the walls that bound the disused track of the L. and S.W. Ry., which here runs beside and beneath the M.D.R.

It is, however, with a much less distasteful form of travel that I associate the finest displays of *epilobium*.

Tramping from Uxbridge *via* Denham to the Chalfonts last summer, I went along a lane that cuts the Denham Golf Course in twain, and then passes through woods to Chalfont St. Peter.

The west side of this track, high banked, backed by a hedge *honey suckle* laden, and with *foxgloves* springing from its foot, was, to a width of six to ten feet, pink with *willow herb* on which a few hive bees and many other insects were working. The bees at the "Tile House," formerly one of the best managed apiaries in the district, had, together with those of the near-by cottage beekeepers, been cleared out by (?) acarine disease. Only one or two stray lots had survived, hence this wealth of pasturage was practically unused.

Quite otherwise was it, however, with a fine stretch of *epilobium* which I saw one day when cycling between Feltham and Ashford (Middlesex) on my way to Chertsey. Here were acres of bloom and myriads of hive bees, presumably from the apiaries of one or other of the Ashford bee-keepers, were revelling in the feast of nectar provided.

Willow herb is of the very easiest cultivation. The seeds, borne in downy lined pods, are carried far and wide by the lightest breeze, and spring up freely in any soil not already too closely occupied, while the roots spread underground, and send up fresh growths to enlarge the patch of plants that, given favourable conditions, reach six feet in height.

The only drawback, indeed, to the introduction of *willow herb* is its all-pervasiveness. In some circumstances it can readily become an unmitigated nuisance to the cultivator and his neighbours, since it is not easy of eradication once thoroughly established.

The ideal use for it would appear to be the clothing of waste places, the embankments of railways, reservoirs, recently cleared woodlands, heaths, etc. The readiness with which *epilobium* springs luxuriant from the sites of clearing fires has earned for it the name of fire-weed, by which it is best known in America. Where *gorse* has, either deliberately or accidentally, been destroyed or reduced by burning, the *willow herb* will come up and repair the ravage what time the charred stumps break into fresh growth at their base. The yellow and green of the *gorse* make a charming contrast with the pink of the *Rose Bay*.

Behaviour of the Alfalfa Plant.

By FRANK C. PELLETT.

Associate Editor, "The American Bee Journal."

Author, "American Honey Plants," "Productive Beekeeping," &c.

A brief mention of the alfalfa plant in the last issue of the BEE WORLD prompts me to add a few notes concerning it. The plant is not native to America, but was introduced from Europe, where. I am informed, it is more commonly called *lucerne*.

Our country is so great in extent that every variety of soil and climatic condition is found within its borders, yet alfalfa thrives over a surprisingly wide extent of territory Given proper attention, it can be made to grow on a wide variety of soils. Given a rich soil and abundance of moisture it will produce an enormous quantity of forage, and for this reason it is a common favourite with the farmers.

Its behaviour as a source of nectar is the thing of particular interest to the bee-keeper. It was my good fortune to plant the first field of alfalfa in my locality at my former home in Iowa. No one seemed to expect it to succeed, and prophecies of failure were numerous. It did succeed, however, and gave abundant crops of hay for several years. I had heard much concerning it as a source of honey, and was disappointed to find that the bees paid little attention to it when it came into bloom. A number of years went by with the bees apparently unconscious of its presence. Then came a season when the spring months were unusually wet, and the soil was fully saturated with moisture. The weather turned suddenly dry and hot at about the time the alfalfa came into bloom, and continued so for several weeks. The bees then worked it eagerly, and apparently secured considerable nectar.

This particular season our climatic conditions approximated those of the irrigated regions of the west, where the atmosphere is hot and dry, and the soil in which the alfalfa is grown saturated with moisture. However, while alfalfa is fairly sure to yield nectar in the irrigated regions of the Rocky Mountain States and also in California, it varies greatly in amount of its secretion from year to year. Although it has been widely planted as a farm crop in all sections of our country, it is very rare for the bee-keepers to get much honey from it anywhere east of the Missouri River. Occasionally, there will be a report of a crop of honey from this source in some of the eastern sections, but such reports are few and far between.

One thing that is particularly difficult to explain is the difference in the quality of the honey from alfalfa in different sections. In the Rocky Mountain region, honey from alfalfa produced in Colorado, Idaho, or adjoining States, is usually very light in colour and of splendid quality. The Imperial Valley of California produces alfalfa honey of quite a different kind. There the alfalfa honey is dark or amber in colour, and of a strong flavour. When this fact was first called to my attention, I insisted that something else blooming at the same time must furnish a dark honey which was mixed with the alfalfa. However, I have been assured that even where nothing else is available at the time the alfalfa blooms and where there is no possibility of mixture, the honey from this region is dark and strong.

From the above facts it will be seen that the secretion of nectar by the alfalfa plant is greatly affected by soil and climatic conditions, not only the amount of nectar being affected, but the quality as well. We are still to a large extent groping in the dark concerning problems of nectar secretion. A large amount of investigation and experiment will be necessary before they are fully understood.

The Mignonette as a Summer and Autumn Bee Plant.

In recording the behaviour of bees towards flowering plants observers often forget to consider their seasonal association. *Phacelia tenacetifolia* would be considered, for example, a poor honey plant by one who does not take into consideration the neighbouring presence of, say, a larger field of *trifolium incarnatum*, which would naturally more strongly attract the bees that otherwise would have gone to the former in numbers.

The same rule applies to the mignonette (*Reseda odorata*). Bees could not be reasonably expected to take much notice of a small garden bed of this fragrant plant in September if more inducement is presented by heather, or mustard, for instance. But for the cottager who is interested in cultivating a splendid bee plant as a source of pollen and stimulative food at a time of scarcity, the mignonette will not be surpassed. The pinkish colour of its pollen is most characteristic, and is sought after by bees as much as its nectar.

It is a native of Egypt, introduced in this country in 1752, and is established also in other parts of Europe and America One might say it is an international plant. It is a perennial, but usually grown as an annual.

For outdoor culture ordinary soil containing lime will do very well. As a border plant or on rockeries in warm, dry positions, it may survive the winter outdoors for some years. The seeds should be sown ⅛ inch deep in rows or masses in March or April.

Where cultivated in large areas abroad, much value is attached to its honey-yielding properties, an acre being considered adequate for fifty or more colonies.

"Mignonette blooms from the middle of June till frost, is unparalleled for its sweet odour, furnishes nectar in profusion, and is well worthy cultivation. It does not secrete well in wet weather, but in favourable weather it is hardly equalled." (A. J. Cook.)

Nutt, three-quarters of a century ago, spoke of it highly as one of the bee flowers which abound with honey.

Bees on a Fruit Farm.

By J. J. KETTLE, F.R.H.S.

The Editor of the BEE WORLD could easily have found another fruit grower who could write more lucidly on this subject, but not one who has a greater love for both apiculture and fruit culture. I believe that bees are the greatest asset the fruit grower has, as so many of our choicest fruits are entirely dependent on insect pollination. I know there are some who differ from this view, but they are few; a recent visitor who had a year's tuition on a fruit farm (in Glos.) of 160 acres, said the foreman there "ridiculed the assertion that fruit blossom was dependent on bees." Still, he may not have liked them. Personally, I am fond of bees, honey and fruit; and those who have taken strips of newly built and filled comb on the tops of bars as I have before supering, know that the flavour of this honey from apple blossom is particularly pleasing to the taste.

Fruit trees just now are very scarce, and as a consequence very costly. Through the years of war and scarcity of labour, trees have not been worked up in the great quantities they were before. The bee-keeper who wants fruit trees must pay the price to have them. He should also buy rooted apple stocks, bud them himself in summer-time, when he can *grow the varieties that do the best on his land*, as many varieties of apples and pears will only grow in favoured localities; apples like Cox's orange pippin, Blenheim orange, and Peasgood's Nonsuch will not do in some of our fields where there is 40 ft. of gravel, but in other deep loamy soils they will do exceedingly well. Bramley's Seedling, Newton Wonder, Lane's Prince Albert, James Grieve, will do anywhere. If you bought the stocks and budded them yourself you could work on them only the sorts that do well in your locality. Gladstone and Beauty of Bath are two of the best for summer harvest, being ripe in August; these are good paying varieties; they can be taken to market when you have many sections of comb honey and heavy lots of run honey, the van or motor car can conveniently and economically take both. These six varieties would be plenty to purchase at the antset, as they would be sure croppers and good growers on most soils. We have not found that the many varieties are the best paying, as some are not regular in cropping. If you added Rival and Charles Ross to the foregoing, you would have a good, regular cropping and good paying lot. In deep loam, well-drained clays, all varieties will do well, but buy very sparingly until you see how they do; you will not know until four or five years have passed, which varieties will do well in the locality.

If the bee-keeper only wants the top fruit without inter-cropping the land he must plant *standard trees*, which to-day are 5/- to 10/- each, as he could feed off the grass with live stock, or keep fowls and geese, but his bees must be kept away from stock, or there will be trouble. Bees should be given a plot to themselves, with a laurel or privet hedge to make them fly high, then cows can feed up close to them as the bees all fly high up, and not into them as they would if no hedge were in front of the bees. If the land is inter-cropped and worked with horses, the bees must be kept away from them, as the swishing of horses' tails is very irritating to bees; but with fowls, bees seem to tolerate them, as they are low down, and not in the line of flight; on our farm they make nests beneath the hives, they have also hatched out their young there; others make a dust bath beneath the hives.

The bee-keeper who plants apples will find that very little need be done in the way of pruning; if the young trees have very long growths on them when purchased, these should be shortened back a third, leaving the two buds to right and left of the shoot, as these will then grow outwards, making a symmetrical specimen, but if the two buds on the young growth are at the back and front, one will grow outwards and the other towards the centre of the tree, which should always be avoided; the two left at right and left will make the desired extension in the formation of a well-balanced specimen tree. The tops of all trees for the first four or five years should have all the points of young growth shortened just a few inches, leaving the top buds after pruning to the right and left, the reason for this is that some varieties develop fruit buds at the point; if these are allowed to blossom and fruit, the weight of fruits will make the young shoot bend over, when it should be growing upwards and outwards. After a few years the trees will look after themselves, and very little pruning will be wanted; only when branches are very crowded is it necessary to thin them. Varieties like Beauty of Bath, Gladstone, Lane's Prince Albert and Newton Wonder make these terminal buds, so will Bramley's Seedling. After the tree is well balanced and fruiting freely we let these terminal blossoms perfect their fruit, because so soon as the trees fruit freely, less long and vigorous growths will be produced, but shorter and harder, well ripened wood will develop, and these have the most fruit buds, which give flowers to the bees and apples to the owner.

In preparing soil for fruit culture, if you have time and plenty of capital and are only planting a small plot, have the ground dug deeply; if a large area is started have the ground ploughed, and the finishing furrows left at the required distances to plant the fruit trees, from 15 to 30 feet (we plant at 15 feet), but for orchards with grass it is usually 20 to 30 feet. These furrows can be all forked through their entire length, and the trees planted in them. We plant the trees at 12 feet with gooseberries and currant between them in the same lines; we get the most paying produce from the bush fruits as they fruit regularly, whereas apples are not always reliable. Some years there are so many and another year very few, but *the bush fruits are a certainty*.

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The Press Mirror.

Much has been accomplished; more than people are aware—so gradual has been the advance. How noiseless is the growth of corn! Watch it night and day for a week, and you will never see it growing; but return after two months, and you will find it all whitening for the harvest. Such, and so imperceptible in the stages of their motion, are the victories of the press.—De Quincey.

Bienen-Vater.

THIE MONTH'S WORK, AUGUST AND SEPTEMBER.

By W. H. Lux.

Do not have too new combs—that is, white ones—for wintering, but do not have them too old. On new combs the bees are too cold, and old ones are out of place in the brood-nest. Combs that have been bred in two or three times are the most suitable.

It is an old maxim founded on experience, that stocks with little honey and a strong population come better through the winter than weak stocks with much honey.

Fill up all empty spaces in the hives with non-conducting materials (wood-wool, paper, chaff, etc.). These are best used in suitable bags, so as to avoid making an unnecessary mess in the apiary in the Spring. I do not care to use hay or moss as packing material, for they attract moisture too much, and are often the cause of mouldy combs.

Aberdeen Free Press.

ISLE OF WIGHT BEE DISEASE.

The so-called Isle of Wight disease first became known about 1904 and gradually spread from the south of England to the north of Scotland, although some regions have escaped, and some beekeepers have been very fortunate in having had no attacks. This disease has been quite calamitous and discouraging, in many cases stopping a very fine industry. In one case near Aberdeen a small farmer lost 49 out of 50 hives, owing to Isle of Wight, and that is but a single instance of the destruction wrought by the disease. As is well known the bee, which is usually a model of efficiency, becomes sluggish, tremulous, falls off the frame, loses the power of regular locomotion, ceases to be able to fly, crawls about in large numbers outside the hive upon the ground, dying off in hundreds when seized with Isle of Wight disease. It is quite certain that an individual bee, once attacked, never recovers. The so-called recovery of stocks or hives is simply due to the replacement by new bees being more rapid than the spread of the disease. Of course, bees are subject to many diseases, being domesticated, living under artificial conditions, fed probably far too much with artificial food, and, above all, screened from the sifting of natural selection. There are at least six well-known diseases of bees, several due to bacteria; one to a parasitic protozoon, by name Nosema apis; another to a fungus; while Isle of Wight disease and the so-called "paralysis" of North America and Australia, and the May disease of the continent, are due to causes hitherto unknown.

So far as is known Isle of Wight disease is confined to Great Britain. In 1912 the *Board of Agriculture* published a very valuable report on Isle of Wight disease, by Drs. Graham-Smith, H. B. Fantham, Annie Porter, and G. W. Bullamore, in which the life-history of Nosema apis was elucidated with great skill Unfortunately, however, the mistaken inference was drawn that *Nosema apis* was the cause of Isle of Wight disease.

DR. RENNIE'S INVESTIGATIONS.

In the following year Dr. John Rennie, of Aberdeen University, turned his attention seriously to the investigation of this mysterious disease following an earlier initiative by Mr. John Anderson, now lecturer in beekeeping under the *North of Scotland College of Agriculture*. Dr. Rennie and Mr. Anderson were able to prove conclusively that *Nosema apis* is not the cause of Isle of Wight disease, for many vigorous bees, in full work and showing no symptoms of Isle of Wight, were found to be full of Nosema apis, while, on the other hand, bees with the unmistakable symptoms of Isle of Wight in many cases showed no trace of Nosema apis. These two facts taken together were enough to close the door to the theory that Nosema apis was the cause of the specific disease in question.

THE DISCOVERERS.

What the cause is seems now to have been elucidated by the joint and harmonious collaboration of Dr. Rennie, Mr. P. Bruce White, and Miss Elsie J. Harvey, all of whom share in the honour of the discovery. Mr. Bruce White, a young bacteriologist of great promise, son of Professor Philip White of Bangor, has won his spurs, in connection with this investigation, his share of the work having been mainly carried on in Professor Shennan's pathological laboratory. The work as a whole, however, has centred in Dr. Rennie's laboratory of parasitology and zoology—which is contained within the department of Natural History. The grants which have defrayed the expense of the prolonged investigations have come from the Development Commissioners, the *University of Aberdeen*, and the *North of Scotland College of Agriculture*, while the recent extension and intensifying of the investigation, which has led to success, have been generally subsidised by Mr. A. H. E. Wood of Glassel, Aberdeenshire, a far-sighted and public-spirited bee expert. The whole is a fine instance of harmonious co-operation.

DUE TO A MITE.

The joint discovery practically amounts to this—that the cause of the disease is a minute mite of new species which it is proposed to call *Tarsonemus Woodi*, thus perpetuating the name of Mr. Wood of Glassel. The mite enters a particular breathing tube of the bee, feeds on the bee's blood, blocks the air passage, and thus cuts off the supply of oxygen from certain muscles and nerve centres concerned with locomotion. It is naturally probable that it also poisons the blood with some specific virus. It is interesting to notice that a related species, *Tarsonemus hominis*, occurs in certain diseased conditions of man and animals, but so far as is known this is the first instance of a mite occurring as an internal parasite within an insect.

The announcement of this discovery will be received with great interest, not only by parasitologists, but by all interested in beekeeping, for the discovery of the cause of the disease is, in most cases, soon followed by useful suggestions as to its prevention and cure. It is beyond doubt that the discovery which Dr. Rennie and his collaborators have made is not only a great credit to the University of Aberdeen, but a positive benefit to the nation.

DISCOVERY DESCRIBED.

At a meeting of the *Royal Society of Edinburgh*, held yesterday (November 1st) in the Society's hall in Edinburgh, a series of papers by Dr. Rennie, Mr. White, and Miss Harvey, illustrated by microphotograph lantern slides, were read describing the work of the investigation and making the important announcement that an organism above-mentioned had been discovered which the investigators considered had been proved to be the causal agent in this disease.

After tracing the history of the disease and giving credit to Mr. Anderson for being the first to call in question the hypothesis that the causal organism of the disease was *Nosema apis*, the authors stated that more recent work from the Parasitology Laboratory at Aberdeen, under the joint Committee above referred to, had shown *Nosema apis* to be a harmful parasite to bees, but not causally related to "Isle of Wight" disease.

CHOKING THE BREATHING PASSAGES.

In Isle of Wight disease the respiratory system of the bee was invaded by an extremely small mite. It belonged to a genus known as *Tarsonemus*. This creature, which was highly specialised in structure, was bred within the bee and was confined to an extremely limited but very important region of its breathing system. Within a space of a few cubic millimetres scores of these creatures might be found in all stages of development, sometimes packed in dense columns so as effectively to cut off the air supply from the surrounding organs.

The detailed pathology described in Mr. White's paper proved the destructive character of the parasites' habits. Thousands of bees had been examined from large numbers of stocks throughout the country, and it had been found that every stock reported by reliable beekeepers or certified by the investigators themselves as suffering from the disease harboured this parasite. Similarly, every individual bee known from its stock history and individual symptoms to be suffering from this disease was likewise found to contain these parasites, and to exhibit the internal disorders which caused the disabling symptoms.

CONDITIONS OF INFECTION.

Investigators stated that they were now able to diagnose the disease in its earliest stages while the bees were capable of flying and foraging. Infection appeared to occur mainly in the hive, the conditions of the cluster making this comparatively easy. Mites had been obtained from the outside of the bee apparently on their migratory passage. The *tarsonemes* included several species destructive to plants, and there were some which had been found in malignant growths in man and in animals. The bee tarsoneme in its structure appeared to be closely allied to those last. Many bees from countries outside Britain had been examined, and so far *tarsonemus* had not been found in these. All the evidence hitherto obtained points to the parasite in bees being peculiar in this country. This coincided with the general testimony regarding the hitherto insular character of "Isle of Wight" disease.

"TARSONEMUS WOODI."

The name of Isle of Wight disease had long been regarded as unsatisfactory, and it appeared that *Acarine disease* would be more appropriate. In view of the great practical interest shown by Mr. Wood, of Glassel, in the work of the research and of beekeeping generally, the director of the research proposed to designate the new species "*Tarsonemus Woodi.*" The investigators recorded their very high appreciation of the support of beekeepers throughout the country in supplying bees and other assistance so essential for the successful conduct of the research.

Nature.

PHYSIOLOGICAL METHOD AS A KEY TO THE CAUSATION OF THE ISLE OF WIGHT DISEASE IN BEES.

By Dr. James M. McQueen.

In the summer of 1918, while working with Prof. L. Hill and Mr. T. A. Webster on gas research, I advised Dr. John Rennie, of the Natural History Department of the University of Aberdeen, that a physiological study of metabolism in healthy bees and in bees known to be suffering from symptoms of Isle of Wight disease should be undertaken, making use of oxygen and carbon dioxide determinations. As a corollary, an investigation into the temperature of bees, healthy and unhealthy, was also indicated.

In the summer of 1919 it was found that apparently bees infected with Isle of Wight disease consumed in a given time much less oxygen than healthy controls. This observation was not reported to me until July, 1920, when I was able at once to draw the conclusion that the symptoms of Isle of Wight disease were due to blocking of tracheal tubes and anoxaemia. Loss of the power of flight was to be expected, as the coordinating nervous mechanism and the musculature involved were deprived of their proper oxygen supply.

Had I been acquainted with the results of a research I had advised, or had the investigator been able to draw a very simple physiological conclusion from the data, whether the data were correct or erroneous, the discovery of a parasite as the blocking agent or disturbing factor in tracheal tubes would have been the natural consequence.

In 1920 this parasite was discovered by anatomical study, and its presence as the agent causing the disease is announced in the Press as the outcome of the researches of Dr. John Rennie, Mr. P. Bruce White, and Miss Elsie J. Harvey.

It will be noted that the physiological method of investigation should have led equally surely to the discovery of the parasite and to the interpretation of the symptoms.

The Beekeepers' Record.

THE ARTIFICIAL COMB.

The progress of the artificial comb in the U.S.A. to the extent reported in the *Domestic Bee-Keeper* for December, 1920, of a daily production varying from 1,000 to 3,000 combs is something worthy of note by those interested in the development of modern beekeeping. Such a rate of production is remarkable in a country where commercial competition is exceptionally keen and large commercial establishments are not generally tolerant of new rivals. Indeed, that was the crucial point which took the Duffy-Diehl Company, of Pasadena, the proprietors of the Macdonald Comb, no less than five months to tackle before finally succeeding in evolving suitable machinery for competitive production.

These facts, which we gather from the forementioned contemporary, are specially interesting in view of the work already accomplished in this country. Our readers will recollect the notes which appeared in the *Journal* during the past two years on both the metal comb and the metal foundation, on which a demonstration was given by Dr. Abushâdy at the offices of the B.B.K.A. on November 7th, 1919, and reported in the *Journal* the following week. Such scientific work conducted in this country, which is necessarily a team research work, requiring the co-operation of the competent engineer, the conscientious manufacturer, and the scientific beekeeper with an open mind, apart from the requisite financial assistance, did not quickly bear fruit for the simple yet essential factor of the engineering assistance which did not materialise. This unfortunate difficulty, however, did not discourage the determined investigators, who have at last succeeded by a simple and effective process in evolving a series of equipped hive frames, ranging from a developed metal foundation to a complete metal comb.

In the U.S.A. and many other countries the metal comb has won both appreciation and criticism. There are undoubtedly both prejudiced admirers and critics; but, taken all in all, the consensus of opinion seems to favour an article more in the nature of a developed artificial foundation than a complete comb; and that, with simple insulating precautions, such an article could be utilised to advantage both in the brood chamber and the super.

Since modern beekeeping is nothing more or less than utilising the natural habits of the honey bee to the advantage of its master on methodical and scientific lines, the advice is rightly given that it is more correct to fill the brood chamber either with wax combs or artificial combs and to entirely *avoid* intermixing as a routine if the best results are to be obtained. A swarm, accordingly, would mark an ideal start. For insulating purposes, two substantial "dummies," one at each side of the brood chamber, will serve the purpose of a side protection; and if a W.B.C. or similar hive is in use, no further protection is needed, with the exception of adequate packing, *both summer and winter*, so as to ward off excessive heat and excessive cold respectively. It is also correctly advised that wintering bees on bare metal combs (*i.e.*, crude combs which have not been worked out during the season) is totally incompatible with the science and practice of beekeeping.

Apart from the experiments conducted at the research apiary of the *Apis Club* during the past two years and duly reported on in the bee Press, the following reproduction of a photograph taken at the apiary of Mr. Gilbert Barratt, of Sheffield, will show how helpful a metal comb will prove to be in experienced hands.*

The brood area, as the illustration shows, is an impressive one, extending almost to the frame bars and approximately to the level of the hive entrance. Those who have used metal combs as they should be used, namely with ordinary insulating care which includes just the requisite number of combs, assure us that such a specimen from a strong colony is by no means exceptional, and that the occasional bad results are entirely due to lack of competence or to lack of aptitude for adaptation on the part of the conservative beekeeper, who under the circumstances should have stuck to his wax combs.

Readers of the *Journal* will now have an opportunity of examining at the B.B.K.A. Museum a presentation specimen of "Adminson's Semi-comb" in British standard size. It represents the net result of the experimental work conducted in this country during the last three years, and which is calculated to meet the requirements of the public by providing the most advantageous compromise between the rudimentary wax or metal foundation and the complete metal comb.

As its name implies, its cells are half in depth that of natural cells. It is certainly well made, and is a real pleasure to handle. Those of us who like a good depth of wax for bees to cluster on in winter will more favour this article than a complete metal comb. We shall be pleased, however, during the coming season to publish notes from our readers on this invention.

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* The illustration is similar to that appearing with Mr. Barratt's article in this issue of the B.W.—Ed.

To save unnecessary trouble, we would remind secretaries of societies desirous of exhibiting the "Semi-comb" not to write to us, as the presentation specimen referred to belongs to the B.B.K.A.; and being one of the first specimens produced at a high cost during last year, it is of special historical value, and therefore its loan is not likely to be risked by the Association.

The British Bee Journal.

THE NEW WORKER CELL.

Special interest is being shown by beekeepers who have had an opportunity of examining the new metal comb foundation (popularly known as *Adminson's Semicomb*) in the new worker cell originated, which considerably increases the utility of the invention.

With due allowance for the negligible waste resulting from the suspension wires, the "Semicomb" in British standard size is calculated to possess over 400 extra cells than a corresponding model of any other comb or foundation in existence, whether in wax or metal. For the Simmins size the increase in cell area is still more appreciable.

A good deal of observation and study have justified the evolution of this new worker cell, which is an important feature of the appliance and an integral part of it. Careful examination of skep combs has been methodically carried out, especially of those built by Dutch bees—which belong to the large races of hive bees—and measurements taken of the various sized worker cells in which breeding has taken place, such as the specimen illustrated below:—

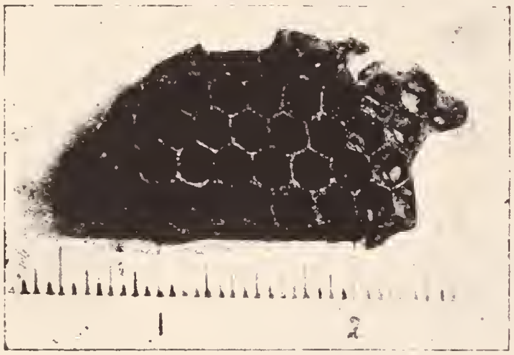

Fig. 36.—Skep Comb, Natural Size.

Study of the hatching results and after-effects on drones from drone layers reared in worker combs (last year's bad mating season specially facilitated this) and of Italian and Dutch workers from combs built by Egyptian bees, also assisted by other positive and negative evidence, have justified the adoption of the new cell as *the most economical cell*, which s not without parallel in Nature, though not regularly adhered o. Before commercial production, this evidence was submitted for criticism to various leading experts of different schools, who did not hesitate to endorse its adoption.

British weather neither presents Scandinavian cold nor tropical heat, and this, perhaps, is the reason for the successful results obtained in this country with the artificial comb or comb foundation when correctly made and properly used.

We shall be interested in reports on honey-extracting results, more particularly in the novel suggestion of heather-honey extraction by powerful centrifugal force. Whether an appreciable amount of heather honey can thus be obtained without the usual trouble and sacrifice of comb remains to be seen. If success can be achieved in this direction, that alone will justify the evolution of the "Semi-comb."

Deutsche Imker Aus Bohmen.

ENTRANCES.

This is a subject that must not be neglected by beekeepers. It is cruelty to animals to force a strong stock to fly in and out through an entrance two or three inches long and a quarter inch wide. Moreover, the honey-crop is thereby reduced; for more bees have to be employed fanning, not to mention the hindrance to the foragers caused by the congestion at the entrance. The writer favours an extra entrance into the super, just at the lower edge of the super frames, to be left open even in winter (of course then reduced to a very small aperture). Two entrances, one close above the other (into the brood-nest) are also good. Crowding and impeding of the fanners by the foragers, and *vice-versa*, are thereby prevented.

[It should be noted that the hives in use were probably the German type, which have the floor-board fixed to the brood-box, so that it is not possible to give more air and entrance-space by propping up the front, as can be done with British and American patterns. Even so, there may be something to be said for two entrances, on the score of better ventilation. What do our readers think?—A. D. B.]

The Canadian Horticulturist and Beekeeper.

THE VALUE OF HONEY.

Wm. A. Weir, Toronto.

At the present time there seems to be an urgent need to reiterate the statements of our food experts and chemical experts so that the public, through the beekeepers, may become more intelligent on the value of honey. It is well known, however, that people do not buy what they eat solely on the basis of scientific pronouncements, so that the subject must be treated from the standpoint of palatability and economy as well.

FOOD VALUE OF HONEY.

Like most foods, honey, although preserving its general character, varies more or less from the average composition. The variations are of interest in so far as they may affect the food value or the way in which the honey can be used to the best advantage in cookery.

So far as its food value is concerned, honey may be roughly described as a syrup with a distinctive flavour and aroma, made up of four parts sugar to one part water. There are several kinds of sugars present in honey, including cane sugar (sucrose), grape sugar (dextrose), and fruit sugar (levulose), the last two together being called invert sugar. Some dextrin is also present as well as a variety of other substances in very small amounts. According to the data furnished by chemists, honey on an average contains from 16 to 18 parts of water, 74 to 78 parts carbohydrates, .07 to .2 parts mineral substances or ash and about 4 parts undetermined substances, such as pollen grain, gum, bee glue, formic acid, volatile oils and other flavour substances. These are average values, and there is considerable variation in individual honeys. The proportion of water, for instance, runs from 12½ per cent. to 25 per cent., being caused by the moisture in the air at the time honey is produced, the stage of ripeness when extracted, and the dryness in which the honey is kept after extracting.

MINERAL CONSTITUENTS.

The most abundant mineral substances in honey are magnesia, lime, phosphoric acid, and iron. Since honey contains less than one part per hundred of mineral matter, it is obvious that even if eaten in large amounts it could not contribute greatly to the total mineral matter of the diet. However, it is claimed that unless care is taken in selecting foods there is a possibility that the diet may contain too little lime, and for this reason it is worth noting that honey contains this constituent. In respect of its ash content, it is more comparable with maple syrup than with cane sugar, from which the mineral substances originally present in the plant juices have been removed during the process of refining.

It is interesting to note that the crystallising characteristic is influenced by the proportion of dextrose (grape sugar) and levulose (fruit sugar) present. Honey will granulate easily if the proportion of dextrose is large, but this is not the case if levulose predominates. However, the preponderance of dextrose or levulose does not affect the food value of the sample.

CANE SUGAR AND DEXTRINE.

The proportion of cane sugar and dextrine is always very small in normal or nectar honey. It is so small, in fact, that it affects neither the food nor cooking value of the honey. But it is different with honey dew, which contains so much dextrine that it requires to be specially handled when it is being used in cooking.

Since the principal ingredient of honey is sugar, it is obvious that it should be classed with the "Fuel Foods" which supply the body with energy rather than tissue. This value is expressed technically in the number of calories by chemists, and the following table is interesting in this connection, showing the number of calories yielded per pound of food mentioned:—

Honey yields	1,485	calories.
Cane Sugar yields	1,860	,,
Flour (White) yields	1,655	,,
Bread (White) yields	1,182	,,
Cornmeal yields	1,643	,,
Rolled Oats yields	1,825	,,

If honey did not contain any water, its energy value would be practically the same, pound for pound, as that of cane sugar.

A discussion of the food value would not be complete without pointing out that the change effected by the bee in the sugars of the nectar is the same as that effected by digestive ferments, and the principal sugars may, therefore, be considered to have undergone the first step of digestion. For this reason honey has been found to be very beneficial in certain cases of indigestion disorder, and the evidence in favour of its use in preference to cane sugar products is growing very rapidly in practical experience.

ECONOMY OF HONEY AS FOOD.

To compare food materials is no easy task, because they vary in price with time and place, and may differ widely in the kind and quantity of the nutrients they supply, palatability, and the care they require to preserve for use. To compare, for instance, cane sugar and honey on a purely chemical basis of caloric value, we would find that sugar would have the advantage. When sugar was selling at 21c per pound on this basis honey should sell for 18c in order to be an economical substitute, but honey is not only probably more digestible and nourishing, since it contributes sugar in a readily assimilable form, but it far exceeds cane sugar in palatability and need of preparation. It is ready to serve in its natural state as a spread, filling, or sweetener.

The Beekeeper's Item.

MY VISIT TO A VERY REMARKABLE FAMILY.

By E. Guy Le Stourgeon.

There are many prominent beekeepers, scattered over the world, who are well known for what they have accomplished, but of them all there is one family that is characterised as a most remarkable one.

"Westward the course of empire takes its way." So wrote a wise man long ago. Observation proves that other things than empires also find their aegis following the setting sun. It seems to be true at least of beekeeping.

During the warm days of late September, when old summer brazenly and for the last time flaunts her gorgeous colours of goldenrod and asters to the world, I had the pleasure of visiting the home of the Dadants on the banks of "The Father of Waters." In the impressions there received I felt that I had come at last to the present centre and home of modern apiculture.

There resides a family of remarkable men; kindly, hospitable and unselfish. By this last word—unselfish—I find them more accurately described than by any other word. When most of us strive to further the interests of honey production we often, in our secret heart, are consciously or unconsciously "boosting our own game." *Our* honey is the most excellent; *our* methods are the most successful; merchandise of *our* manufacture is far superior; *our* bees are more docile and better honey gatherers than any in the wide, wide world. Not so the Dadants. Few have done or are doing more than they to foster and further the interests of beekeeping, and yet at the countless meetings of beekeepers there is seldom one held without a member of this family or a representative of the firm present, and never is any "drumming for trade" a part of the programme.

This is in great part the cause of their success. Honest to a fault, tolerant of everyone's ideas, generous and charitable to all, and earnestly striving to build firmly the future of our industry, they inspire a feeling of respect and confidence that binds men to them.

C. P. Dadant, senior of the family, is an author and thinker of international repute. His books are translated into most modern languages, and his name and methods are known to the corners of the earth. He is the logical successor to Dr. Langstroth as the leader and mentor of our craft. When conditions in Texas beekeeping were intolerable and we felt that our business was doomed to early collapse, he came to visit us, and at meeting after meeting across our State, he planted the seed of co-operative effort that afterwards blossomed in our matchless Association. To us is he especially endeared because of his wise advice and sage counsel in that hour. A great measure of our success during the past few years is due to him.

The home of C. P. Dadant sets far back among beautiful trees on the very crest of the high bank of the Mississippi. The foot of the great Keokuk dam rests on the Illinois side at exactly this spot, and the lake above the power house laps at the feet of the sage.

There are three sons in the business of Dadant & Sons, and one son-in-law. They are Louis C., Henry C. and Maurice G. Dadant and Leon Saugier. One of the notable features of this notable family is the unity with which it is bound together in a common purpose. One soon feels in contact with them that this purpose is not the building up of a firm name nor yet a great business but finds its centre and interest in our common good—in the making of American beekeepers and in the extending and improvement of beekeeping.

Each of these men fits snugly into a fixed place in the organisation. Louis is the outside managing head of the business. Henry is the office manager. Maurice has the great apiary system in his charge and is the business manager of the *American Bee Journal*. Leon has the factory as his province and watches daily to jealously guard the quality of its output.

It was interesting to note the system in Henry's office where several people are employed to take care of the many shipments of beeswax and combs that are handled every day. It is a sad fact that as many as 17 such shipments arrived *in one day* with no name to show from whom they were received. I found that Texas beekeepers are as bad as any others on this score. I was told of a half dozen packages in the "unknown" file from our own State.

The *American Bee Journal* office is a busy place. The Dadant family is not all made up of boys. Two wonderful women, Misses Valentine and Clemence, are carrying on the Dadant idea in giving service here. Their publishing business is growing by leaps and bounds. Most of the more valuable books in modern beekeeping are being issued from their press.

In the *American Bee Journal* office also one receives a hearty welcome from that staunch friend of Texas Beekeepers, Mr. Frank C. Pellett. He is an author of more than national note and a naturalist of world-wide fame. We spent many hours in recalling incidents of his visits to the homes of Texas beemen. A reading of his remarkable book on *American Honey Plants* shows how vividly he was impressed by our flora and our climate.

I find that owing to the limits of space, I have not said the things I wanted to say about these kindly and hospitable people. The visit to the orchards hanging full of red and golden fruit; the tramps through the autumn woods; the auto rides in the early twilight, the musical treat in the evenings, when these talented friends played and sang for our pleasure; the great friendly library of Mr. Dadant, with its wealth of bee-lore gathered from the writings of the centuries; and many other such pleasures that always must remain as vivid impressions on my memory of happy days. I cannot express these things to you as I wish that I might, and I cannot adequately describe them. I can only urge you, if opportunity should arise, not to fail to personally visit and become acquainted with this, the most remarkable and most wholeheartedly American of the families devoted to modern apiculture—the Dadants, of Hamilton, Hancock County, Illinois.

Die Deutsche Bienenxucht in Theorie Und Praxis.*

FEBRUARY.

"A sufficient supply of fresh air and adequate room will usually restrain stocks from harmful excessive early breeding."

HOW FAR BEES FLY.

After the flow in his district was over, a beekeeper took about thirty very strong stocks to an out-apiary for the sweet-clover flow. This out-apiary was at least 6 km. (3¾ miles) from the home apiary, and there were a town and some tall furnace-buildings in between. The journey was safely accomplished. The owner returned home, to be met with the enquiry: Had he not had an accident on the way? "Why?" "Come and see!" In front of the empty bee-house everything was black with bees, and the multitude grew greater from minute to minute. The bees had been working on those clover-fields from their home apiary. The conclusion is drawn that bees will work at a distance of 7 km. (4⅓ miles) when there is nothing to gather within their usual flight-range, the stocks are at the height of their development, and the district is considerably overstocked.

A. D. B.

Proceedings of Associations and Clubs.

Society lives by faith, and develops by science.—Amiel.

The National Beekeepers' Association of New Zealand.

We are in receipt of the report of the Seventh Annual Conference of the *National Beekeepers' Association of New Zealand* issued as a supplement to the *New Zealand Beekeepers' Journal*. The Conference was held last June, and the account of the proceedings is very interesting. Apart from the important topic of the "Apiaries Act" and "Apiary Boundaries," such interesting subjects were discussed as "Isle of Wight Disease," "Grading Honey and Methods of Handling," "Beekeeping in England," "New Zealand Flora in Relation to Honey," "Discharged Soldiers and Beekeeping," "Use of Excluders," etc.

Regarding apiary boundaries, the following replies from the A. I. Root Company to questions bearing upon it in a paper prepared for the Conference by Mr. R. H. Nelson are instructive: "If an apiarist has been in the field for a year or more, or before anyone else discovered it, he has a moral but not a legal right in this country to a location within a mile and a-half to two miles of his apiary. The range of bee flights varies in different localities. On level land, where the ground is covered with shrubbery or trees, bees will not fly as far as they will upon naked land, or upon high ground where bees can fly across a valley or a body of water. In such cases they will go sometimes three or five miles, but on level land they will rarely go beyond a mile and a-half, providing it is covered with trees or shrubbery." As to whether it is morally right for any other commercial apiarist to dump an apiary within three miles, two miles, or one mile from an established apiary, the A. I. Root Co. think that "two miles would be safer, and three miles better yet. One mile would be altogether too close. Ordinarily they should say that other bee-yards should not be located closer than three miles. This would give a range for the bees of both yards of a mile and a-half."

"Beekeeping in England" was the subject of an address by Mr. A. R. Bates, who was acting as an instructor in beekeeping under the Educational Scheme adopted by the New Zealand Expeditionary Force after the signing of the Armistice. He summed up his personal observations in this form: "I do not think at present we can learn a great deal from British beekeepers, except what to avoid (*sic*), but some of the colleges devoted to research work should produce good results. We might with advantage have similar institutions in this country."

The B.B.K.A. Autumn Conversazione.

The B.B.K.A. Autumn Conversazione was held on October 21st at the Central Hall, Westminster, nearly 200 persons being present, including some well-known beekeepers. Mr. T. W. Cowan, the veteran chairman of the Association, presided. Two interesting lectures, one by Mr. G. Bryden on "Experiences in Italian Beekeeping," and the other by Mr. J. Price on "The Production of Heather Honey," were given. Regarding the former, we are fortunate in publishing from the pen of the celebrated Italian queen breeder, Signor Enrico Penna, an original article which forms an additional valuable contribution on its subject matter, two helpful articles from Signor Zanini having already been published. As to heather honey production, we are also favoured by an excellent original contribution from Mr. J. Price, which will appear in a following number.

It is specially gratifying to find a commercial beekeeper like Mr. Bryden paying a high tribute to the ability and conscientious methods of the three leading Italian breeders, when some vested interests here have been for some time busily engaged on insinuations and misrepresentations, as a reward to the co-operation of our Italian friends in re-stocking the country. Even the amusing suggestion has been advanced that the precautionary measure of clipping a queen's wing is intended to camouflage an old queen (a fine knowledge of anatomy and practical beekeeping!). Whilst the masked pretenders, who are so highly clever in using a campaign of insinuations for opposing Continental breeders are falsely boasting about their thousands of splendid colonies, their army of admiring visitors, and their huge production for which there is an impatient market, let alone the secrets in the art of beekeeping that are known only to their chosen company, our readers will see the contrast in the communications of Zanini and Penna. Another gratification is that the tribute paid to the co-operation of Italian breeders took place under the auspices of the B.B.K.A., the secretary of which, amusingly enough, used to be accused of obstructing the importation of Italian queens. These tactics having failed, he is now accused of taking a commission on the Government supplies! Such an irresponsible and indecent hint was made not long ago in a contemporary. It would not have merited any reference, especially as it happens not to be our function to wash dirty linen either in private or public. Unfortunately the irresponsible writer of that statement, just because he volunteered to share in the organisation of the *Apis Club*, and did practically nothing but obstructions and self-glorification, some beekeepers have been misled to imagine that his insinuation had our inspiration or sanction! The pages of the BEE WORLD, from its first number, testify to the contrary. Only it is hardly fit for people who appeal for federation and fraternity to conduct quarrels; and therefore we must patiently ignore as much as possible all acts of ingratitude and calumny, even against ourselves. There is no better example of forbearance than that of Mr. J. Herrod-Hempsall, the genial acting editor of the *B.B.J.*, in treating the irresponsible offender as his best humorist. In this connection we appreciate his repudiation of sharing in any way in the remarks of which we complained in our last issue. Such being the state of affairs in a renascent industry, we hope our worthy Italian colleagues will understand and forgive.

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* Editor: Dr. F. Gerstung (author of "Der Bien und Seine Zucht").

The Scottish Beekeepers' Association.

The Autumn Quarterly Council Meeting was held in the Christian Institute in Glasgow, the Rev. R. MacCowan, of Kiltarlity, Inverness-shire, and, later, the President, Mr. J. H. Langlands, of Dundee, occupying the chair. There was a very large attendance, representative of every part of the country. It was reported that the public meeting held in Glasgow the previous evening had been a great success, and it was resolved, when practicable, that such meetings should be held in connection with each Council meeting. The Treasurer reported that the finances were in a satisfactory condition, there being a balance in hand of £16, in spite of the outlay of over £50 in connection with the Show at The Highland in Aberdeen in July. He was authorised, if necessary, to draw upon the reserve funds, until the Board of Agriculture grant for this year is paid.

The Propaganda Committee reported on the work that was being done in forming new associations in various parts of the country and expressed satisfaction that the possession of the Register of Beekeepers made it possible for our representatives, for the first time, to approach individual beekeepers in areas where no associations at present exist. The prospects of a considerable increase in the number of associations and branches are very good.

The Registrar, Miss Beveridge, reported that we had now a record of 8,000 beekeepers in Scotland, with 28,000 hives, and it seems likely that when all the reports are in the total number of beekeepers will approach 15,000, with probably 50,000 hives. The reports from some districts are all in, and in these districts we find one beekeeper for less than 4 square miles and for every 600 of the population, and one hive for every 740 acres. Aberdeenshire leads the way both in actual number of hives and in proportion to its size and population.

The Education Committee reported that a considerable number of lectures had already been arranged for the winter and that the sets of lantern slides were in great demand. There were three different sets with lecture notes. The slides were sent out by parcel post, free of any charge, to associates or secretaries of associations or to experts or beemasters. Only the return postage need to be paid. The number of candidates for the various certificates had been greater than the Committee anticipated and, on the whole, a high standard of proficiency had been reached. The President then presented the certificates that had been gained since last meeting to the successful candidates who were in attendance. The librarian reported that the library was in a flourishing condition, and that the arrangement had been much appreciated whereby books are sent out postage free, only the return postage being paid by the borrower. In this way a very considerable educational influence is being exerted. Gifts of valuable books had been intimated by Dr. Ross, Lochgilphead, and Rev. R. MacCowan, Kiltarlity, and the donors were heartily thanked. Gifts of books or lantern slides will be much appreciated for adding to the collections. The librarian was authorised to issue a new catalogue.

The Markets Committee reported that the honey harvest had on the whole been a very disappointing one. Testimony was borne to the value of the markets leaflet issued indicating the market value of honey; for these had enabled the members in most cases to sell their honey locally to advantage, and the depots had received very few consignments to dispose of.

It was resolved to appoint a Special Committee to suggest such revision of the constitution as might seem desirable and to submit any proposed changes to the various Federated Associations. A scheme of insurance of hives will be considered at the next meeting of the Council, which was appointed to meet in Cupar-Fife.

Votes of thanks to the chairman and hon. secretary were heartily given at the close of a most successful meeting.

HONEY JUDGE CERTIFICATES.

John Anderson, B.Sc., Aberdeen.
Rev. J. Beveridge, B.D., M.B.E., Gartmore.
Henry Crombie, M.A., Dunkeld.
James R. Fenwick, Perth.
D. M. MacDonald, Dufftown.
Joseph Tinsley, Kilmarnock.
Robert Steele, Newburgh.
John W. Moir, Edinburgh.
Rev. W. Murdoch, Culsalmond.
John Robertson, Wormit.
Miss N. M. Robinson, Glassel.
A. H. E. Wood, Glassel.

EXPERT BEEMASTER CERTIFICATES (E : B.S.B.A.).

Rev. W. Murdoch, Culsalmond, Insch; Marshall K. Watt, Aberdeen; Aberdeenshire.
James Cochran, Kilmarnock—Ayrshire.
John Robertson, Rothesay—Bute.
John Cunningham, Bonhill—Dumbartonshire.
John Robertson, Wormit; Henry A. Payne, Newport; Charles K. Riddell, Tayport—Fife.
Rev. T. F. Best, Broughty Ferry; David Y. Preston, Dundee; Alex. Duncan, Mains, Dundee—Forfarshire.
Henry Howie, Larkhill—Lanarkshire.
Rev. Roderick MacCowan, Kiltarlity; George H. B. Pritchard, Bunchew—Inverness-shire.
Robert Morrison, Peebles.
Thomas Greig, Falkirk—Stirlingshire.

BEEMASTER CERTIFICATES (B : S.B.A.).

Rev. George MacKay, Drumblade; William G. Grant, Inverurie—Aberdeenshire.
Matthew Brown, Ayr; William J. Mack, Ayr; John Sherry, Tarbolton; Andrew Limond, Minnishant; William S. Allan, Prestwick; W. J. A. Douglas, Alloway; John Henderson, Cumnock—Ayrshire.
Rev. C. C. S. Dron; Alex. McLaren; A. J. Macdonald—Sandbank, Argyll.
W. B. Leitch, John MacEwan, Tarbet; James Steele, Dumbarton; James Grierson, Old Kilpatrick; John A. Baird, Helensburgh; Boswell Russell, Helensburgh—Dumbartonshire.
W. Coltherd, Ecclefechan—Dumfries.
David Pullar, Dura, Cupar—Fife.
Charles M. Scott, St. Mary's—Forfarshire.
Miss Catherine Macdonald, Kiltarlity; Donald Ross, Glenconvinth; Roderick Macrae, Culburnie; James Clark, Bunchrew ?Invernessshire.
Miss Jean Halliday, Southwick—Kirkcudbrightshire.
William R. Brown, Strathaven; Robert Bell, Govan—Lanarkshire.
John Shields, Linlithgow.
James A. Menzies, F.E.I.S., Duncan Keir, Gartmore—Perthshire.
William Hodgson, Greenock; John Moore, Johnstone; Thos. T. Ritchie, Barrhead—Renfrewshire. (*Communicated.*)

South Staffordshire and District Beekeepers' Association.

ANNUAL ASSOCIATION SHOW.

The members of the above Association held their Annual Show of Bee Produce and Bee Appliances at St. James's School, Eve Hill, Dudley, on Saturday, October 30th, 1920.

The Show was opened by the Mayor of Dudley, T. W. Adshead, Esq., J.P. Mr. A. B. Whitehouse, presiding, said, in introducing the Mayor, they were very grateful to the Mayor in coming to open the show, especially considering he being so fully occupied as the chief citizen of the Borough in his office as Mayor, a large employer of labour, and connected with so many philanthropic works

The exhibits were not so numerous as some years in consequence of the unfavourable season for honey gathering, and the attendance was not so large as formerly, caused undoubtedly by the difficulties of railway travelling through the miners' strike. The principal object of the Association was to produce honey. For many years this article has been largely imported from foreign countries, wealth leaving this country and enriching others, the Association was out to produce our own honey and thus benefit the community.

The Mayor, in opening the show, said the secretary had called upon him several times before to be present at the Christmas Dinner at the Institution, of which he was Master, but bees were out of his experience. He could not say anything about them; if he had been asked to say something about bedsteads he would have been in a better position. He had sought information from the dictionaries and encyclopedias, but found nothing very enlightening. He was pleased to know that the object of the Association was to produce an article of food which was so largely imported and so necessary; it would not only produce wealth to them, but to the country and help in the matter of transport. He should be pleased to help the Association in its endeavours.

The Judge, Mr. Calishaw, of Cannock, said the difficult part of the Judge was not that there were so many exhibits in consequence of the bad condition of the season, but the quality. Every exhibit was worth a prize. The ladies, he would recommend them not to put so much colouring ingredients in the cakes.

The prizes for the exhibits were as follows:—

	1st Prize.	2nd Prize.	3rd Prize.
Class 1: Section Honey.	Mr. Cheshire.	Mr. Hildreth.	
Class 2: Light Run Honey.	Mr. Cheshire.	Mr. Griffiths.	Mr. Hildreth.
Class 3: Dark Run Honey.	Mr. Cheshire.	Mr. Hildreth.	Mr. Thompson
Class 4: Granulated Honey.	Mr. Cheshire.	Mr. Hildreth.	
Class 5: Bees Wax.	Mr. Cheshire.	Mrs. Thompson.	Mr. Griffiths
Class 6: Bee Candy.	Mr. Hildreth.		
Class 7: Wired Brood Frame.	Mr. Hildreth.	Mr. Cheshire.	
Class 8: Best Wired Shallow Frame.	Mr. Hildreth.	Mr. Cheshire.	Mr. Thompson.
Class 9: Best Exhibit of a Practical Nature.	Mr. Hildreth.		
Class 10: Best Cake.	Mrs. Thompson.	Mrs. Griffiths.	Mr. Cheshire.

A vote of thanks was passed to the Mayor and to the Judge for their services rendered.

Tea was provided in the Parish Hall, after which a meeting of the Association members was held. Mr. Whitehouse, President, said he was a small beekeeper of a few years' standing; he knew a little about bees, through seeing his brother with his bees, and the war causing a shortage of sugar, he determined to commence beekeeping to help to meet the want. The first and second years he had been fairly successful, but recently he lost his stocks through I.W.D. In looking at the matter from a poor man's view, the loss of stocks through I.W.D. was a very serious matter to him, and he thought the Association ought to adopt some method to assist the beekeeper in his loss. Mr. Price, Stafford County Expert, perhaps would be able to enlighten on the subject.

Mr. Price said he did not see how this could be arranged at the present time. It was a big question and required a lot of safeguards. Mr. Price then addressed the meeting, taking for his subject, "*My Visit to the Apis Club.*" He said the Club was instituted for the purpose of bringing beekeepers together in all parts of the world with a view to discussing matters in modern beekeeping and for experimental and educational purposes. For this purpose THE BEE WORLD, the official organ of the *Apis Club*, was published. Dr. Abushâdy, the originator of this, is an Egyptian by birth who studied Medicine in this country and practised for some time at Ealing and visited Hurst Hill, Nr. Bilston, nearly three years ago. Shortly after leaving this district, owing to ill health, he closed his London home and laboratory and went to live an open-air life at Benson. "This was where I visited him. It is at present the headquarters of the *Apis Club*. I have never seen such an enthusiast before. He has put all his energy into the subject; and despite his ill-health, he is establishing an apiary of a good size. There were 90 stocks of bees to be wintered which are used for commercial, experimental, and training purposes, and are increased to double this number or more during the season. I was greatly surprised to see everything in such splendid order. It was a treat to walk round the apiary with such an interesting companion as the Doctor. Apart from the enormous amount of work required in preparing and editing THE BEE WORLD, dealing with vast correspondence connected with the *Club*, and the work among the bees, the Doctor has turned his attention to inventing a *metal comb* which promises to supersede anything yet attempted. His experiments with this comb are wonderful, have been necessarily costly, but it is pleasing to see that he has been able to invent a comb which undoubtedly will have a great future. I frankly admit I never expected to see such self-sacrifice as the Doctor and his English wife are enduring in their up-hill struggle for the sake of uplifting the craft of beekeeping and placing it on a higher plane. A scheme of shares ultimately affecting the *Apis Club* has been arranged, whereby funds can be provided for the further development of inventions and research, and the distribution of THE BEE WORLD. It now lies entirely with beekeepers themselves whether these two valuable assets are to be held in abeyance for want of support, or otherwise. I therefore appeal to all beekeepers to do their best to help forward the good work."

Mr. Price went on to explain that while Benson was at present the recognised headquarters of the *Apis Club*, it was desirable to form branches in different suitable centres, where the members could meet to discuss problems appertaining to the development of the objects of the *Club*. These gatherings would be most convenient for distributing knowledge and the results of experiments that are being carried out at the headquarters and elsewhere by members. This would not necessitate an extra subscription, for the present membership fees would entitle all members to a copy of the BEE WORLD and, with adequate enrolment, would provide expenses for the room for meetings and sundry expenses for same. He believed everyone would see the importance of these branches, and he should be pleased if those present, who were anxious to form a Staffordshire branch and help forward the good work, would communicate with him direct or through the Secretary of the Association.

The Secretary, giving an address on "*The Objects of the Association and Suggestions,*" said the objects were instruction, sociability and helpfulness. Referring to bee literature, he strongly recommended THE BEE WORLD as being thoroughy alive to the beekeepers' interest. It is attractive, well printed and illustrated, and served a double purpose in helping themselves and providing funds for the *Apis Club*. He also referred to the creation of a library of bee literature containing the best known books on bees; to demonstrations at the summer meetings for the benefit of new members; and to the advice of experts in visiting members' apiaries. He also referred to the social side of the Association, forming a bond of union amongst beekeepers through asking questions.

comparing notes and receiving advice; and suggested that the Association should consider some scheme whereby it could help those members who have suffered loss by the I.W.D. either by a fund established, or approaching an insurance company, for that purpose. He would like the Association to be in the fullest sense a live, attractive, and useful organisation, helpful to its members and the community at large. Votes of thanks to Mr. Egginton, Sedgley, for the loan of his specimen hives, to the Chairman, Mr. Price, and the Secretary terminated a very successful gathering.—(*Communicated.*)

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Ontario Beekeepers' Association 40th Annual Convention.

The Canadian Horticulturist and Beekeeper for October reports: The Ontario beekeepers are holding their 40th Annual Convention at the Ontario Agricultural College, Guelph, on December 1st, 2nd and 3rd, 1920.

Ontario has always been noted for largely attended and interesting conventions. This year a record attendance is expected, in view of the fact that the new apicultural building will be formally opened by one of the members of the Ontario Cabinet.

The programme includes some of the most prominent beekeepers of both the United States and Canada.

The Secretary is making all arrangements for rooms to ensure comfort while attending the meetings.

The *Ontario Beekeepers' Association* issues a hearty invitation to all beekeepers both north and south of the invisible line to attend this Convention.

The example of this leading Canadian Association is worthy of emulation by those of us who do not yet fully appreciate the idealism in professional fellowship.

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The Apis Club.

The Annual Conference of members of the *Apis Club* will be held at the Central Hall, Westminster, S.W.1, at 2.30 p.m., on Saturday, April 2nd, 1921, for the purpose of:—

(*a*) receiving the Report of the Organising Secretary for the past year;

(*b*) deciding on the future character and development of the *Club;*

(*c*) appointing two representatives on the Bee Advisory Committee of the Ministry of Agriculture, and granting a general mandate to them in relation to Bee Diseases Legislation;

(*d*) executing any other business assigned to the Annual Conference by the provisional Constitution.

The Conference Hall will be open at 2 p.m. Nearest station (3 minutes' walk): Westminster, District Railway.

⁂ The above notice was distributed by post to all members of the *Club* a month in advance of the date of the Conference.

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South-Western Counties' Convention of English Beekeepers.

THE BEE AS SEEDSMAN.

We give an extract from the paper of the above title read by Mr. G. G. Desmond (*G.B.K.A.*) at the Five Counties Conference held at Gloucester last summer. (BEE WORLD, Vol. II., p. 24.)

I give you a new name for *Apis mellifica—Apis fructifica*, the fruit-making bee.

Not very long ago it was thought that honey fell from the stars. Now that we know that it comes from the flowers, it is not at all generally appreciated why the flowers go to the expense of producing nectar. A careful examination of the nearest flower will go far to answer this question. Take the commonest flower just now, the mallow. You will find no blossom with stamen and pistils ripe at the same time. First the stamens ripen and the bees carry the pollen to some older flower in which the stamens have withered and the pistil has grown above them and opened to receive pollen. You will find the same and other contrivances in force with every plant you examine. In most of them, the flower first waits several days in the cross-fertilisation condition and then, because no bee comes, fertilises itself. And even where a flower is in a position to drop its own pollen on its own stigma, it can easily be proved that stranger pollen will reach the ovaries more quickly than the flower's own pollen.

(The lecturer also referred to experiments showing the greater vigour of seedlings that are the offspring of a cross, showed that the farmer gets more hay as well as more seed through the operations of the bees, and cited the well-known cases of many of our best fruits that can only be fertilised by pollen from another kind of apple, pear, plum or cherry respectively.)

The bee having been shown necessary, is there any wild bee to be compared with the hive-bee as seed-maker? One hive of bees in Spring is equal in number of foragers to about five thousand humble-bees, of which very few will survive to found nests each containing less than three hundred workers. The one hive, even without its swarm, will still outnumber them all. The honey it has consumed and accumulated will be a measure of its work—say a hundredweight consumed by the grubs, sixty lbs. for the bee-master, and thirty lbs. to carry it through the winter. Search a million humble-bees' nests and you will not find a record nearly equal to this. And we must remember that several of our commonest species of humble-bee systematically rob flowers of their honey by biting holes in the corolla, without performing the service of fertilisation.

Darwin allowed the bees to visit 20 heads of white clover and kept them from 20 other heads. The first 20 yielded 2,290 seeds, the second 20 produced only 500 seeds. Now, how much clover seed do the bees produce in storing one lb. of honey?

Suppose that a hive of 60,000 bees weighs 5 lbs. more in the evening than in the morning. There are 40,000 foragers, and each goes out 5 times in the day. Therefore 40,000 visits to the field will yield one lb. of honey. If 100 florets are sipped at each visit (a very, very mild estimate, indeed—there are sixty florets to each head of white clover) that means that 4,000,000 florets are fertilised for each lb. of honey stored. But at night a quarter lb. of excess moisture is fanned off and a further million blossoms must be visited to make up the ripe pound. There are five seeds in each pod, so 25,000,000 seeds made for each 5,000,000 visits. At one end of the balance you have 1 lb. of honey, worth half-a-crown, and at the other 34 lbs. of clover seed, worth 8s. per lb. Is not the bee, then, well entitled to the name of *Apis fructifica?*

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Our Book Shelf.

Books still accomplish miracles; they persuade men.—Carlyle.

OUTAPIARIES.†

By M. G. DADANT.

The American commercial apiarist who visits the United Kingdom is likely to condemn most, if not all, of our methods unless he remembers the difference in climatic and other conditions, and especially the fact that beekeeping here is principally in the hands of cottagers and smallholders, who have been for a long time seriously engaged in fighting disease.

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† Published by the "American Bee Journal," Hamilton, Illinois, U.S.A. 125 pages, 50 illustrations, cloth bound. Price one dollar.

Their urgent need, therefore, is more scientific knowledge, since once the control of disease by the rank and file of beekeepers is a fair success, the future is fully assured. The number of small bee farmers will then increase and more money will be invested in beekeeping.

We are already witnessing a decline in the virulence of I.W.D., although bad methods of beekeeping are still prevalent, resulting in exhausting conditions and mortalities which are wrongly attributed to the former. Beginners will therefore be discouraged and the number of those who keep bees is bound to be less at the close of each season. But taking the craft as a whole, it is being steadily augmented, whilst the unfit is being eliminated, and we can safely look to the future with some confidence.

That beekeeping in the United Kingdom is dominantly a smallholder's occupation is no excuse, however, for ignoring the commercial aspect of it, especially as commercial beekeeping in this country is marching forward, slowly but surely.

Commercial beekeeping being based on the *economic* way of doing things, the aspirant will not find a better teacher than the man whose business is to practise it and who belongs to a family and a circle of investigators, authors, and above all, pioneers in practical apiculture.

"*Outapiaries*" is a delightful and instructive manual treating a most important method of commercial beekeeping; in fact, the only successful method of making the utmost out of beekeeping, so far as honey production is concerned. The style of the work is simplicity itself, and the manual is profusely illustrated, fine glazed paper being used throughout. The broad-mindedness of the author will readily impress itself. He does not lay hard and fast rules, but gives an outline of methods, leaving to the outapiarist to select whatever method suits his conditions. This is the only fitting *rôle* for an educationist.

The successful smallholder who can make 200 per cent. or more profit from his bees is likely to fall in the trap of a sudden expansion with disastrous results; or to assume the position of a teacher to the would-be commercial man. The latter will be well advised to study "*Outapiaries*," when he will realise for himself the enormous labour and the large capital—both working and reserve—which is needed if appreciable success is to be achieved. He has of course "to eliminate the non-essentials and to formulate a plan that will give him the greatest returns for the least labour involved. He must make the most out of the apiary always, but he should do it in the least time, and not sacrifice himself to petty details to the detriment of his ever-growing industry. The grass may not be well kept, the hives may be out of level, but the other extreme of minute exactness in outapiary work is nearly as bad as lack of care, at least financially." Commercial beekeeping here, being still in its infancy, the foregoing points may be understood by many, but not the comparatively large capital necessary for equipment, including means of conveyance and pay for skilled assistance, if disease is to be controlled. The small man is therefore well advised not to expand other than very cautiously, unless he has a substantial reserve capital behind him, and to carefully study the many factors involved in a commercial enterprise, including the unavoidable failures which have to be cheerfully borne and compensated for in a following season.

We congratulate Mr. M. G. Dadant on a worthy addition to the beekeeper's library.

SOME BEE DISEASES.‡

By J. TINSLEY, F.E.S.

Lecturer on Beekeeping, West of Scotland Agricultural College.

This short paper gives a good account of the means of spread of brood disease in the hive, of the symptoms of the two forms of foul brood, and of sacbrood; also an excellent description of the method of treatment to be employed.

It is doubtless advisable to exercise caution in assuming that the results of American investigations hold good for European foul brood in this country; but it seems regrettable that a writer of Mr. Tinsley's eminence should repeat the statement that *Bacillus alvei* is the cause of this disease. Even if White's results be considered not to hold for Europe, it appears to be fairly certain from his work and that of Maassen that *B. alvei* is a non-pathogenic organism. If Mr. Tinsley has satisfactory proof to the contrary, it will be of great interest, as all previous observers seem to have failed to produce the disease by feeding pure culture of *B. alvei*.

Mr. Tinsley states also that the causal organism of sacbrood is unknown. In America, it appears to be due to a filtrable virus, but it is of course possible that this may not be the case with the European form of the disease.

Annie D. Betts.

THE LURE OF THE HIVE.*

I have just received an attractive little booklet with the suggestive title, "*The Lure of the Hive.*" This is the substance of a lecture delivered by H. Clark, Esq., Chairman of the *Leicestershire and Rutland Beekeepers' Association.* Carefully reading this interesting brochure, I can testify to it being indeed an interesting account of the life, habits and work of the honey bee. In language suitable to a popular lecture, Mr. Clark discourses graphically—and more important still—with accuracy on the wonders which make "the lure of the hive" an ever recurring source of pleasure to those of us who keep bees. I must say the title, "Lure of the Hive," rather appeals to me, as undoubtedly there is an allurement or witchery pertaining to a colony of bees. To those who want to interest friends unacquainted with bees and their ways I can with confidence recommend this booklet as being the charming guide to place in their hands.

R. Whyte.

Knowledge humbleth the great man, astonisheth the common man, and puffeth up the little man.—Pr.

THE SEASON IN EGYPT. We have had the worst hornet season on record, and I have lost nearly all my bees. I have caught them steadily in my entrance traps at the rate of 500 per diem. One of my other traps recently took 2,500, 1,500, 1,800, and 900 in four consecutive days. This gives some idea of their numbers. If you reckon 10 bees a day per hornet, you can easily understand that even the most populous apiary cannot stand the strain for long.

This year (1921) I intend to send my bees to Alexandria during the hornet season as there appear to be no hornets in the rainfall area. Why? I do not know what limits the distribution of the hornet.

I have, however, had quite a good honey harvest, but have lost my bees.

Queen hornets appeared on the 14th of October. All my previous first records have been on the 17th of October.

We had had an exceptionally warm autumn; tho weather being almost like summer.—Lewis H. Gough, Ph.D., F.E.S.

TRAPPING ANTS. If the method you describe (p. 46) as being in use in warm countries of employing a poisoned bait to kill ants be likely to be used in England, would it not be well to advise the addition of a cheap colouring (? aniline blue) to well mark the fact?—Senex.

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‡ Reprinted from "The Scottish Journal of Agriculture," Vol. III., No. 3 July, 1920.
Bulletin No. 96, The West of Scotland Agricultural College, Kilmarnock.

* Publisher: P. Stevens, 7a, Slawson Street, Leicester, Price 5d. post paid.

BEES AND BEEKEEPING IN FORMOSA.

There were in Formosa some beekeepers with native honey bees, an Oriental race allied to the Japanese, for thousands of years, but not with *Apis Mellifica.* Few years ago, some European races of bees were brought into this island from the mainland of Japan, especially so during last year when many colonies were shipped. With the exception of few failures the imported bees are doing well. In Formosa, wintering bees is not a problem, but summer management is.—YASSUO HIRATSUKA, Japan.

ABOUT TWO BEE JOURNALS.

"There is no bee paper in the whole world to be compared for size and general excellence to the *American Bee Journal*. Its dainty letterpress, large plate illustrations, and its news from the area of a large Continent give to it an importance and, we should say, a circulation like no other. The next bee paper of high standard and excellence is, I consider, our English BEE WORLD, edited by Dr. Abushâdy, large in size, crowded with information, and having articles of considerable literary and scientific interest. It is however, suffering, and I fear languishing, for want of sufficient support. It is praised in all quarters, extolled as a brave venture, the kindest things are said about it, but not done for it, for the one thing it needs is more subscribers. If it should fail, as may happen, it will be a sorry comment on the outlook and spirit of English beekeepers.

Such a paper, if it could be kept alive, would be in time of immense value to the bee industry in our country. The needs of English beekeeping are not the same as those mostly dealt with by the *American Bee Journal*, and much as one likes to run over its comely pages and peruse crisp articles, it is with a feeling that the climate, flora, and other conditions of that Continent make a gulf of wide difference between those of these isles.

English beekeeping is very much pursued by working men who have not the time, and often not the mental training, to understand and enter into pioneer efforts which are always needed to make the bee industry healthy and progressive. That cannot be helped; but we do deplore that so many, so large a majority of these small beekeepers are content to go on year after year in one old rut. There are those who keep bees all their working lives and yet never reach out to a single new idea; they know of nothing that happens, in the work, beyond their own parish. They would think it money lost to subscribe to a bee paper; and the discussions on the hundreds of problems of bee life and bee manipulations sound to them unnecessary and nonsensical. It is this small, niggardly outlook which is such a dead weight on all effort for uplifting and improving the English bee-industry."—The REV. A. A. EVANS in *The Herald*.

USE SALT WASHES FREELY.

In the *Western Honey Bee*, for October, Dr. Mary C. Jennings speaks highly of the hygienic value of salt washes in the apiary. She summarises as follows: "I have used salt washes freely, and always do so before allowing a swarm to enter their new home, allowing the salt water to soak in well. It is well to have a receptacle of mild salt solution accessible to the apiary most of the time."

U.S.A. CROP REPORTS.

We have received from the G. B. Lewis Company, of Watertown, Wisconsin, U.S.A., a bulletin dated August 23rd, and entitled "A Resume of Honey Yields and Markets Gleaned from Correspondence—Beeware Service." It is worth reproducing as a good specimen of business service which is worth following by leading beekeeping establishments in different countries:—

New England States.—Good honey flows are reported from most parts of these States, but the exported crop is too small to affect markets.

New York and Pennsylvania.—Yields have been very spotted in these States, but where yields were secured, they were far better than average, and New York particularly will have much honey for sale, of good quality. Buckwheat light.

Ohio, West Virginia, Kentucky, Indiana and Michigan.—Yields in these States have been spotted, but in all the yield, particularly in Ohio, is far above the average. Light honey.

Tennessee, North Carolina and South Carolina.—Reports indicate the biggest yield of surplus honey known in these States for years, and North Carolina particularly will ship much honey of gallberry-tupelo type.

Georgia and Alabama.—Yields in these States have been good, and excellent flows prevailed. Out shipments will be about as usual of fair to dark.

Florida.—Florida and West Coast and North State men secured the biggest yield in years of excellent quality tupelo-partridge pea type, which will be shipped out heavily and seriously affect southern market sales. Crop reported moving slow. East Coast—failure. Orange type yield good

Mississippi, Louisiana, Arkansas, Oklahoma.—Crops reported only fair, due to excessive rains throughout the early year. Oklahoma and Mississippi may ship out some honey which is usually of quite fair quality, sweet clover, alfalfa.

Texas.—Reports best average yield throughout State in several seasons. Much of this sold locally, some individuals selling heavily for out shipments.

Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas, Nebraska and Dakotas.—All these report excellent crops as a whole, white clover usually light, sweet clover and other white types available in quantities. Wisconsin heaviest in years, yield affected somewhat by serious winter losses. Selling rapidly.

Montana and Wyoming.—Reports very heavy yields in river valleys; crop probably up to normal, quality standard for district. Selling slow.

Colorado, Utah, Idaho, Nevada, Arizona, and New Mexico.—All report fair to heavy yields with spots of low production. Utah particularly heavy, as is Arizona. Quality up to average, selling slowly. Mostly sold out of State.

Oregon and Washington.—Yields reported fair to heaviest in years in spots Quality excellent, market draggy, selling slow, not much shipped out.

California.—Early reports couched to indicate possible failure. Considerable 1919 honey was being held early, this mostly moved. Reports indicate biggest average yield California ever knew in twenty years. Offerings have been reported as low as 16½c. Moving slow, market draggy, offering heavy.

Southern honeys selling slowly, prices reported low as 12c. Eastern New York particularly, some moved at 22½c, big quantities. Offerings by big buyers seem seldom above 22½c anywhere; buying cautious, market slow from sugar price range down and usual first market uncertainty. Comb honey, No. 1, selling in all markets apparently at 7 dollars per case up, jobbing.

PLANT SOME SWEET CLOVER.

Everybody who has bees should plant some sweet clover. In most sections it never fails to yield nectar, and it is a valuable honey plant for beekeepers, while it is a farmer's friend in disguise. You can plant the seed at most any time; with your wheat or oats in the fall or Spring. And when you lay by your corn, plant it there and you will see a telling tale on the next crop of corn. Plant it in every waste piece of ground by simply scattering the seed over it broadcast. We could tell much more about the value of sweet clover as a honey plant.—The *B.K. Item*.

"RECONCILIATION"

The following letter, which appeared in the Press during October, was sent to Professors of Arts and Sciences in Germany and Austria by an influential body of Professors and Doctors of Oxford University:—

"To the Professors of the Arts and Sciences and to Members of the Universities and Learned Societies in Germany and Austria.

"Since there will be many of you who fully share our heartfelt sorrow and regret for the breach that the war has occasioned in our friendly intercourse, and since you cannot doubt the sincerity of the feeling which engendered and cherished that old friendliness, you must, we believe, be sharing our hope for its speedy re-establishment.

"We, therefore, the undersigned Doctors, heads of Houses, Professors and other Officers and Teachers in the University of Oxford, now personally approach you with the desire to dispel the embitterment of animosities that under the impulse of loyal patriotism, may have passed between us.

In the field where our aims are one, our enthusiasms the same, our rivalry and ambition generous, we can surely look to be reconciled; and the fellowship of learning offers a road which may—and if our spiritual ideals be alive, must—lead to a wider sympathy and better understanding between our kindred nations.

"While political dissensions are threatening to extinguish the honourable comity of the great European States, we pray that we may help to hasten that amicable reunion which civilisation demands. *Impetret ratio quod dies impetratura est.*"

Replying to this manifesto, 10 German University Professors, who are members of the Reichstag, wrote as follows, according to Reuter's Berlin correspondent:—

"Science knows only one aim—namely, the search after truth. It requires for the performance of this one task the common labour of all, regardless of national boundaries.

"The world war interrupted this joint labour and dissolved many personal ties. We are ready to resume these connections, and by common labour to relegate to oblivion everything offensive, spoken or written, in both camps. Our hopes are set on the future."

VITAMINES IN HONEY.

In *Gleanings* for last September an interesting article by Stancy Puerden on the presence of *Vitamines* in honey appears. The writer says: "At last we have proof that *there is a moderate amount of the fat-soluble vitamine, called Fat-Soluble A in comb honey*, and it is probable that there are small amounts of the vitamine, Water-Soluble B, in all honeys, but no anti-scorbutic vitamine.

The Fat-Soluble vitamine, you will recall, is the one which is often alluded to as 'the growth principle,' and which is contained in abundance in the fat of milk, the yolk of eggs, and in green, leafy vegetables. Incidentally, MacCollum, of Johns Hopkins University, who has conducted so much research along this line, considers Fat-Soluble A of the utmost importance in the diet. Being much less widely distributed in foods than Water-Soluble B, there is much more danger of a deficiency of it in the diet."

To the best of our knowledge, the earliest reference to the value of vitamines in honey, especially in relation to the wintering problem, appeared from the pen of the editor of this magazine in the *B.B.J.* for October 24th, 1918; in *Co-operative Food Culture* for November, 1918, and February, 1919; in *Bee Craft* for May, 1919, and again in the *B.B.J.* for May 22nd, 1919. Scientific interest in this question was since then aroused both in the Continent and America. The recent tests recorded in *Gleanings* are of special interest as opening a field for research on improving the bee's artificial diet so as to approach to a form of *synthetic honey*, which could be used with advantage for bee feeding when natural food is not available.

THE METAL COMB IN NEW ZEALAND.

The appreciative review of the work of George Mitchell Macdonald which appeared in our last issue has received in turn a merited appreciation, from many readers, of the broad vision, the fraternal feeling and the decent spirit of admiration for the hard, struggling inventor, which our worthy colleague, Mr. Richard Whyte, so nobly displayed.

Doubtless, pages of this magazine would be taken up by the history of the ordeal of worries, privations and oppositions which such a genius has endured, including the liquidation of his first company, prior to reaching his present goal.

We cannot help regretting that, whilst in America trade opposition instead of co-operation is to be expected, some beekeepers in this country, for the mere sake of cheap self-advertising, willingly play in the hands of vested interests. More than one example of this kind was brought to our notice including chivalrous sneers at the man when he was at the height of his financial difficulties, in a Continent where the fiercest economical competition is taking place—though rarely discordantly—a view which we note several other bee papers share.

The MacDonald Comb, having already been tried in different parts of the world and favourably reported on by those who have no axe to grind, it seems unnecessary to refer specially to its trial in New Zealand, were it not that some people are anxious to echo the fable that it has been a complete failure in warm countries. Describing the function of the 1920 Ruakura Field Day (held on February 4th) the *N. Z. Beekeepers' Journal* for March refers to the exhibition of the metal comb as follows: "The aluminium comb attracted a great deal of attention, there being an unused comb just as received from America, and others containing brood and honey, also those used for surplus. It must be allowed that as far as one could see, the queen and bees accepted this latest invention quite satisfactorily, and it would be only quibbling to take exception to the cells missed by the queen owing to the braces running through the comb in four places. Later in the day, the 'surplus' combs were put through the extractor. We were given them to uncap, and took no pains to alter our method as when uncapping wax combs, and in spite of the combs not being well built out all over, there was very little damage to the cells noticeable. With combs well filled out beyond the wooden frame, it would be only carelessness to damage the metal part of the comb. One frame of unextractable honey was brought from the Tauranga State Apiary to see how it would fare in the extractor. Although the honey did not come out quite clean, the demonstration was sufficient to indicate that with power and a good run in the extractor, the amount of thick honey retained would not be very much. Altogether, we are very much impressed with the aluminium metal comb"

NEWS FROM PORTUGAL.

"The 1920 honey harvest here has been almost nil; from all over the country I gather the same reports. I have been more fortunate than my neighbours, as I have been able to take about 30 kilos from five hives and have had plenty in all hives for winter feeding. I could have taken much more if it had not been for the necessity of providing winter food for the other hives, which consisted of those which I transferred from cork hives in the Spring and a nucleus made to receive an Italian queen in May, 1920. These, when I returned from England at the beginning of September I found on the point of starvation, and to save them I had to feed sugar syrup. However, I am glad to say towards the end of the month they began to gather a little and brood, and now they are getting stronger. With the good stores I have given them I hope to bring them safely through the winter, especially as the ivy and eucalyptus are now in bloom, and if we get some fine warm weather, as is to be expected, they ought still to gather a good deal. I hear that other beekeepers in desperation have robbed the brood chambers almost completely of their honey!

The two Carniolan queens you were so very kind to send me arrived safely yesterday afternoon (October 14th). I had quite given up hoping for them as the trains and posts have been so irregular owing to strikes. I see by the postmark that they were dispatched on September 20th! However, they all seem to be very well, owing to the beautifully careful manner in which they were packed."—**Mrs. G. B. Mitchell.**

DOINGS IN BEEDOM.

The *Canadian Hort. and Beekeeper* reports the following news: Manufacturers of bee supplies have announced the cancellation of current price lists, and the outlook is an advance of as much as 50 per cent. in some of the apiary supplies. Manufacturers of honey cans have also issued a new price list announcing a further advance. The total advance in honey cans since the beginning of 1920 is in the neighbourhood of 30 per cent.

Since the latter part of April, 1920, there has been in Japan a decrease in the price of everything excepting sugar and a few other items. The honey and bee demand has also decreased. Honey taken off in the Gange region was rather good.

A bee succeeded in shutting off the electrical current of Maryland towns. It stung the Rev. John Brandon Peters on the nose while he was driving his auto. He lost control of the machine which knocked down a pole carrying the wires from the power house at Laurel, Del.

The honey market in Ontario is still in a condition of dulness, with very little trading going on between the wholesale houses and beekeepers.

THE MAILING OF QUEENS The *Australian Beekeeper* publishes a suggestion from Mr. J. W. Patterson, of Willaura, Victoria, that "the Postal Department be asked to issue labels for attachment to mail bags containing queen bees. Queen breeders desiring it can have their packages of queens put in a separate mail bag at an extra charge, and if these are specially labelled it may ensure better handling and their going right to their destination without interference." The suggestion is of equal interest to queen breeders the world over.

THE METAL FOUNDATION. We have great pleasure in recording our appreciation of the continuous moral support which is reaching us regarding the development of the Metal Foundation, not only from distinguished beekeepers in the United Kingdom, but also from others the world over, including such widely separated countries as Switzerland, Portugal, Egypt, the United States, New Zealand and Japan. From the trading aspect, three leading houses in different continents have already signified their interest.

The heavy burden and finance of tho experimental work has been borne by a few, as is usually the case with every new departure of marked significance.

The selection of an embossed type was due to economical considerations, although the engineering difficulties were not lost sight of. Again, the selection of hardened steel rollers was purely a matter of economy. It was beyond question at the beginning to invest thousands of pounds (that were *not* available!) in powerful stamping machinery designed for mass production. With modest means and with only encouraging results and the great interest of the public to guide, the plans for production were developed and the order for the mill placed in the hands of a good firm who submitted, in the first instance, good specimens of the sectional rollers, which were duly passed as quite satisfactory. On the basis of their assurances, full preparations for marketing were done. After prolonged delays, however, faulty non-hardened rollers were the outcome, which were of course rejected from the beginning, the specimens of "foundation" which they produced were worse than useless—a discrediting product in every respect. However, the efforts put in the task stimulated the spirit of research; and comparatively few specimens were sent out. In spite of the circular distributed by Messrs. James Lee and Son, Ltd., at the beginning of June, applications continue to be made for the purchase of faulty specimens, but these applications are refused. The Editor of this magazine is specially indebted to the hearty co-operation of Messrs. Adminson, Ltd., and Messrs. James Lee and Son, Ltd., and for the conscientious methods adopted all through. The circular of the latter, previously published, speaks for their clean business attitude, long well acknowledged.

We have not received any interesting observations for publication relative to the defective specimens which hardly presented a row of good cell bases; the rest of the surface area being buckled and irregularly dotted with markings which were more like the fading bases of transitional cells than anything else. It was asking the bees to do the impossible with such "scrap" metal!

The above remarks may be of historical interest and will not be out of place when read in conjunction with the disappointments encountered by the inventor of the "*Money-comb.*"† Of course this is only a fraction of what has been endured in a forward movement from which no retreat has ever been attempted, and it is still premature to record its trials and its object lessons.

Of the defective specimens, for the indirect and free distribution of which we were personally responsible, about a dozen or so were put in the hands of beekeepers as "approved" articles by some who proudly act as tools for trade oppositions. The poor people who tested them, instead of observing intelligently the behaviour of bees towards an impossible proposition, were, under a false guide, more interested in expressing their annoyance with the idiotic inventor! Such characteristic trade misrepresentations and oppositions bear their origin with them and serve as a lesson in showing the folly of indiscriminate trust when taking the public in one's confidence.

The original specimens experimented with in the autumn of 1919 were very crude, and the work done on them by the bees was an *achievement* in the opinion of learned and experienced beekeepers. The hope was not to produce commercially something worse, but of course something significantly better Yet the following photograph (Fig 37) of a shallow frame with comb built on crude metal foundation (non-waxed) by a small cast, and with natural comb built beneath the bottom bar, speaks for itself. It is sent us by Mr. F. M. Claridge, the well-known Essex beekeeper. The thickness of the metal comb used was .003 of an inch, but the impressions produced by the ordinary mill were far from being perfect, to judge from an unused specimen sent to us. The logical conclusion, except, of course, to the super-critics and the opportunists (who have an axe to grind, including the claim of all successes and the ridicule of the least failure!) is surely that with a decent product to compare, for instance, with Root's wax foundation, the fullest success is assured.

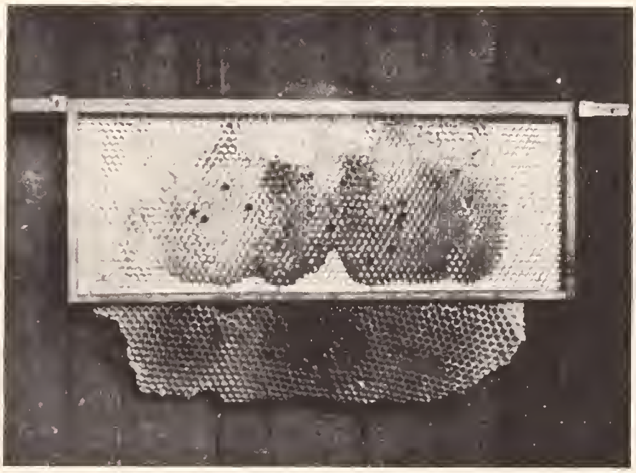

Fig. 37.

Space prevents us from further discussing these interesting practical and scientific points. Apart from the notes appearing in this issue in the "Modern Inventions" Section, interested readers may be referred to Patent Specifications, number 150, 549.

The future is doubtless open for greater research, enterprise, tolerance and co-operation. As for the present, progress is unfortunately often the companion of those who have to do their level best under trying circumstances, but is never known to the timid and selfish, much as they will claim its friendship when in need of such an appearance.

DISGUSTED WITH HONEY. At Bay View, we met a lady who had been very fond of honey. But accidentally, she saw, in an exhibition, a comb with bees on it in an observing hive. She said: "I was very fond of honey, but when I saw all those flies on that honey, tramping around, it disgusted me. I can't eat honey any longer. I did not know that honey was made that way!"—*American Bee Journal.*

HOW BEES STEER. Dr. Stellwaag, in the "*Biologisches Centralblatt,*" has given so interesting a theory concerning the flight of bees that it has recently been quoted in "*The Scientific American,*" and also in "*The Literary Digest.*" His experiments and observations would seem to show that instead of steering by shifting its ballast, by throwing its abdomen or wing covers from side to side as formerly supposed, bees steer by varying the wing pressure, which is accomplished by changing the angle and force of the wing beats, and thus operating the wings as stabilising planes.—E. R. Root in *Gleanings*.

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† THE BEE WORLD, Volume II., p. 3.

A PROTECTIVE HOME.

I have carried into effect your ideas of an *insulator hive* for the protection of bees in exposed districts, and I am very pleased with my experience. When migratory beekeeping is not being practised, I find a heavy, substantial, and protective hive an advantage; and when one makes his own hive, the extra cost over that of an ordinary pattern is not prohibitive. I had occasion to inspect one colony as late as October 20th and was surprised to see four frames of brood and eggs galore, even then.

The enclosed photograph of my apiary will show you, I hope, that I endeavour to keep up-to-date. I thoroughly study every number of the BEE WORLD which I think is, so far, the finest move in beedom, and should have every encouragement. —Ernest Bliss, Dunstable, Beds.

A BEE AND A WASP.

Dr. T. S. Macaulay (Seremban, Federated Malay States) sends the following note:—

A young planter came to see me in urgent haste, saying he had a bee in his ear. He had been walking over a young clearing, and had occasion to jump a log, thus disturbing a nest of small black wood bees, which rose up and enveloped him. One landed on the side of his face, whereat he gave himself a slap over the ear. He felt a loud, buzzing, and very unpleasant noise in his ear. On arrival at the bungalow a friend tried to spear the insect with a tiepin, but without success. When I examined with the speculum I could see a dark mass, far in, like a small plug of wax. After syringing with a simple warm alkaline lotion for ten minutes or so a small, half-drowned native bee was delivered. A few soothing drops were instilled, and the young man returned to the estate much relieved.

I received an urgent message to attend the manager of a large rubber estate. I found him very ill in bed. He told me that on walking through one of the fields he wandered into the danger zone of a wasps' nest; he beat a hurried retreat, and escaped with one sting under the right eye. He proceeded to the bungalow, lay down, felt nauseated, and vomited on two occasions. Later he fainted, and had the feeling that he was passing out. When I saw him he was prostrate, the right eye was bunged up, the face was swollen, his body covered with a red scarlatina-like rash, the pulse was 140 and feeble, the temperature 102° F., and altogether he was very miserable. Simple stimulant treatment with warm alkaline baths revived him. He told me that on a former occasion two stings had almost killed him, and he believes that in his case three or more would involve a fatal issue. The local wasp is larger than the home variety, and the natives are quite aware of its dangerous sting, and take every opportunity of burning the nests.—*The British Medical Journal*.

"CALIFORNIAN HONEY."

Needless to say, good honey is produced in California, U.S.A., as anywhere else, but when syrup is disposed of in this country as fine American honey and the public are charged 2s. 8d. per lb., a double harm to the honest producers and the consumers results. We commend this serious matter to the attention of the American Press. Following is a report of the court proceedings which was published in the *Eastern Daily Press* of November 1st:—

BEFORE THE MAGISTRATES.

East Dereham, Friday.

(Before Messrs. A. G. Copeman (who presided), T. Redford, G. Brett, T. B. F. Daniel, A. Ruston, and W. Wilson.)

Henry Walden, grocer, High-street, Dereham, was summoned for selling honey adulterated with at least 70 per cent. of starch syrup and cane syrup.

Mr. W. B. Barry (Middleton), Inspector under the Food and Drugs Act, prosecuted, and Mr. B. H. Vores appeared for the defendant, who pleaded guilty.

Mr. Barry said the honey was sold as Californian honey, but it consisted largely of syrup, which was not a constituent of honey. It was artificially sweetened with saccharin, and was practically an artificial product. He understood the defendant had a warranty from the people who supplied him, but unfortunately he did not take advice in time, and the warranty was not available as a defence.

In evidence Mr. Barry said on September 11th he purchased at defendant's shop 2 lbs. of honey at 2s. 8d. He produced the certificate of the Public Analyst, which stated the sample submitted to him contained at least 70 per cent. of starch syrup and cane syrup, and that the proportion of genuine honey in the sample was at the most 30 per cent., and it might be much less. The mixture had been artificially sweetened by the addition of saccharin.

Mr. Vores said unfortunately the defendant was ignorant of the law with regard to the warranty he had got, and he therefore had a good defence which was cut out simply by accidental circumstances. It was purely a matter of misfortune on his part.

Edwin Watts, of the Standard Health Food Co., Ltd., who sold the honey to defendant, deposed in effect that on the invoice he gave a guarantee that the honey was pure. He subsequently wrote a letter to the defendant to the same effect. His firm purchased the stuff as Californian honey, but they were let down in the matter, and were taking proceedings against the man who supplied it. So far as the defendant was concerned, he was perfectly innocent, and no reflection should rest upon his character in the town, and any expenses attached to the case witness's firm would be glad to meet.

The Chairman said when the defendant took these things he ran the risk, and he should be fairly satisfied that what he sold was genuine. He would have to pay £1 inclusive.

KIND THOUGHTS.

Reviewing the start of our second volume, our contemporary, "*Bee Craft*," comments as follows: "The June-September number has just reached us and is, as usual, a fund of information both practical and scientific. It is to be hoped that the proprietors, Messrs. Adminson, Ltd., meet with the encouragement they deserve, and are thus enabled to carry on the good work they have started towards the high ideal at which they aim."

As we expected, the hundreds of pounds that have been invested came, with few exceptions, from humble pockets—from people who, though in modest circumstances, are rich in idealism, in character and interest. The numerous messages of kindness received can never be forgotten. Was it worth while? Indeed it was. What does it matter for a few rats leaving what they imagine to be a sinking ship in comparison with a wealth in friends

Here are typical messages taken haphazardly from our files and represent but a fraction of what would overtax a double number, if all were to be published:—

"I beg to make application for two shares in Adminson, Ltd. I wish I was in a position to give further financial support, but unfortunately I am not. I am sure the whole beekeeping fraternity owe you a deep debt of gratitude for what you have accomplished and the sacrifice you have made for the benefit of beekeepers generally. It would be a great loss to the bee literature of this country were the BEE WORLD to drop out of circulation."—G. E. G., Stoke-on-Trent.

"Please put my name down for three shares in Adminson, Ltd. Your organ is really splendid reading. It is quite evident you don't require any advice but shareholders!"—A. B. L. Worcester.

"I am heart and soul with you in the good work you have done and are doing for the Craft. Unfortunately I am a very poor man with two bad seasons in succession. I am poorer than I was two years ago, having a very limited income which has not increased with the cost of living. I cannot therefore do what otherwise I would have done. I enclose £1 (this I earmarked for boots). Please allot me one fully paid up share in Adminson, Ltd., or put it to my credit for five shares, to be fully paid up, say, next June, when I hope to have some return from my bees. I would gladly do more if my means would permit, and may do so in time, as I have faith in the undertaking. Trusting other beekeepers will respond to your call in proportion to their means, as I have done; you would then have no further cause to worry, with which I fully sympathise."—S. D., Kings Langley.

"I have pleasure in enclosing my cheque, value £3 15s., deposit on 10 shares in Adminson, Ltd. I would like to see some activity amongst the leading lights in bee societies up and down the country."—T. G. E., Wiveliscombe.

"I enclose application form and P.O. for two shares in the Company. I regret being unable to subscribe for a larger number, but I am not one of those fortunate individuals who draw £5 10s. a week for 48 hours work. I have to put in a longer week for less than half. It is only my interest in beekeeping which makes me apply."—W. J. F., Markinch.

"By all means put my name down for 10 shares in Adminson, Ltd. The BEE WORLD is most excellent, and it is very sincerely to be hoped that it may, ere long, be on a self-supporting basis. It thoroughly deserves the support of every beekeeper."—E. S. W., Bramley.

"I note that you are really 'up against it' and, considering the magnitude of your undertaking, it does not surprise me. My sincere good wishes are yours, but I can render little besides. Unfortunately I am not among the wealthy people to whom a thousand pound cheque would be a mere bagatelle. I was flourishing in 1914 and abandoned everything to enlist in Kitchener's Army. I have now to commence, not where I left off, but where I was many years previously."—C. W. P., Brecon.

"I would like to have taken more than 10 shares, but money is scarce as business is in such a precarious state just now. However, I sincerely hope you will be successful in getting a good response, so that the BEE WORLD can be put on a solid basis, although I admit that I find many beekeepers are not so enthusiastic as they pretend or imagine themselves to be, especially when it means putting their hands into their pockets."—L. W. W., Nottingham.

"As we go on, we are bound to get more and more support, especially from advertisers when we are able to issue our paper punctually. Taken all in all, our worthy Editor has accomplished wonders in the way of producing a paper that is in every way a credit to him. I am sure the accretion of support will be steady, and, once a subscriber sends in his subscription he will remain on your list. I am applying for thirty more shares."—R. W., Glasgow.

"I beg to enclose cheque for £5, in payment for 5 shares in Adminson, Ltd. I hope the BEE WORLD will find it possible to continue on its present level, and wishing you every success."—F. W., Maidstone.

"I am very sorry to see you in troubled waters, and I am truly sorry because, from my first knowledge of you, I at once saw you were a power for good to beekeepers, and also because it is not in my power to help you much. I am 63 years of age, with no surplus, but relying on my weekly wage, and do not know when my employer may pass me outside for a young man. But I am anxious to help you, and if in January I can squeeze two or three shares I shall feel it an honour to do so."—R. H. W., Stratford-on-Avon.

"After reading the splendid June-September number of the BEE WORLD, I expect to hear that the share issue has been over-subscribed. If not, evidently British beekeepers have not yet woke up. But never mind, Sir. Keep pegging away; you are making great progress under the circumstances, I presume since June, 1919. I am applying for five shares, which is as much as I can afford after a poor season."—C. E. G. Guernsey.

"No one could have been more pleased than myself to see such a splendid journal as yours make a start in Britain, and no one will be more sorry if it is discontinued. Surely there should be enough business spirit among your beekeepers to prevent a real, live journal like yours from going under; if not, then it is not worth any one's while to try to assist British beekeeping."—I. H., New Zealand.

"I beg to apply for five shares in Adminson, Ltd. I am greatly interested in the BEE WORLD, and sincerely wish it every success."—T. K., Sweden.

"Sorry to hear you are yet in financial difficulties, and I am afraid my mite will not afford much relief, but I trust it will breed you thousands. Anyhow, you may always rely on my mite, when you want it as a nest egg, any time you care to call for it."—R. P., Dent.

"Please allot me five shares. I have the fullest sympathy with you in your long struggle."—J. M. N., Leicester.

"Enclosed please find P.O.'s for £1 3s., being 10s. 6d., my current subscription fee to the Apis Club, and 12s. 6d. deposit on five shares in Adminson, Ltd. The thanks of beekeepers ought to be yours for your untiring energy in the cause of beekeeping, and I wish very earnestly to tender mine."—W. M., Wales, Nr. Sheffield.

"I am sure you deserve all the help you find necessary to carry on your good work, and wish you more than success."—W. P. M., Syston.

"I am applying for eight shares in Adminson, Ltd., and wish I had the time to personally urge the support of the Club and the BEE WORLD. I have done, however, the best I can by writing letters. How many people could you get to guarantee a sum of, say, £20 for the good of the cause by a whip round amongst the beekeepers they know? I will undertake to raise that amount within a month if by so doing it will enable you to get a similar promise from such a number of people that it will ensure continuance of your undertaking. Do not hesitate to let me know if there is any way in which I can help, and within the limits of my time and my power I will do what I can from sheer admiration of your work."—W. L. B., Dorridge.

"We are both stirring men, Dear Mr. Abushâdy, and so I need not waste many words to show the sympathy and highest consideration I have for you."—E. P., Italy.

And they are still coming in. Are we downhearted? Never!

ORGANISING ITALIAN BEEKEEPERS

We understand that Signor Penna is planning vast proposals by which the scheme of his private breeding should be enlarged to cover the whole province of Bologna. He writes to us: "Availing myself of the happy circumstances of keeping bees in one of the best provinces of Italy regarding the fairness, health and purity of Italian bees, and of other circumstances such as the fact that Mr. Piana (whom I prize highly as a gentleman and a specialist breeder) lives also in this same province, I am proposing the foundation of a special association of all beekeepers of the Province of Bologna under the patronage of the Government, with the principal object of improving to the highest possible degrees the bees of this province. Suitable crossings should be established in all the apiaries between the best strains of pure Italian bees, Mr. Piana helping me in leading up the matter and both of us offering gratis queen cells and virgin queens, also fertile queens in some cases. By this means this province would ultimately become the very garden of Italy for bees, and the control of mating that is now *naturally* guaranteed in relation to the purity of the race would become extended to the choice of strains for drones. Of course many other advantages would be offered to associated beekeepers. We have some good reasons for hoping that our Ministry of Agriculture will willingly take an interest in this question, giving authority to the rules that must be established for the accomplishment of this plan."

CANADIAN BEEKEEPING.

From Mr. G. E. Louth, of Hamilton, Ontario, Canada, we learn that bees are wintering well there, winter proving milder than that of the previous year. Mr. John Brooks, of Vancouver, B.C., says in a letter dated February 16th: "Bees have so far wintered fine, and all reports show them in good condition. The wholesale market price of honey in quantities is 30 cts. (1s. 3d. per lb.). Beeswax is selling at 2s. 6d. per lb. for clean yellow, with a brisk demand."

NATIONAL PREJUDICE.

An appropriate comment on Mr. C. P. Dadant's fine article in this issue of the BEE WORLD is the following Press cutting which appeared on the 7th of last January:—

Speaking at a meeting of the *Society for Experiment and Research in Education* yesterday, Mr. H. W. Nevinson said he regarded international education as international knowledge. The one good thing in human nature was that if they got to know people they got to like them. At one period the English people, he said, hated the French, but they got to know them later, and liked them.

For 10 years some journalists and a few politicians lashed out hatred against the Germans for various reasons. During the war they continued, knowing nothing of the German people.

There was the story of the Germans burning the bodies of their soldiers, which was due, not only to an ignorance of the people, but an ignorance of the language. If they had had international education with regard to the French and Germans those ideas would not have been accepted.

THE SEASON IN NEW ZEALAND.

Writing on January 27th, Mr. I. Hopkins informs us that the New Zealand honey season "—just closing—promises to yield a crop of honey above the average. It is estimated that after supplying the New Zealand markets, there will be a surplus of between 700 and 800 tons of honey for export—not bad for a small Dominion."

INSPECTION OF BEE APPLIANCE FACTORIES.

We are pleased to note that such well-known firms as Baldwin's, Burtt's, Lee's, Meadows' and Taylor's are inviting beekeepers in no half-hearted manner to visit their showrooms and factories. Such visits both to experienced beekeepers and novices are often educational and not devoid of business gain to both the exhibitor and the visitor.

THE CONTROL OF ACARINE DISEASE.

We commend to the attention of our readers the following "*Instructions for the Control of Acarine Disease,*" recently issued by the Joint Committee on Research in Animal Nutrition of the University of Aberdeen and the North of Scotland College of Agriculture:—

1. Weak stocks which crawl in spring should be examined for *Tarsonemus woodi*. If found, the stock should be destroyed. This may be done by burning sulphur within the hive. Such procedure will at the same time disinfect the hive, frames and quilts.
2. Owners of stocks weak from any cause, should adopt every possible means to prevent robbing.
3. For the present, it seems desirable to exercise the greatest caution in purchasing bees. These should be obtained only from apiaries with no recent history of disease. With regard to bees offered for sale from districts where the disease is prevalent, it should be borne in mind that *Acarine disease* may be present in a stock, while as yet collective crawling has not developed.
4. With a view to preventing, as far as possible, the mingling of bees of different stocks, avoid placing hives of similar appearance in rows. If this is done the hives should show some distinctive colouring.
5. General advice—
    - (*a*) Do not attempt to winter stocks known to be diseased.
    - (*b*) Destroy weak stocks in spring which crawl from *Acarine disease*.
    - (*c*) If the disease show in summer before or during the honey flow—
        - i. Do everything to stimulate breeding, requeen if thought desirable.
        - ii. Use a crawler trap, empty it daily, burn the dead bees, never return crawlers to the hive.
        - iii. If the stock become weak, prevent robbing and destroy as soon as foraging shows failing signs.
        - iv. Control, as far as possible, the entrance of Drones to hives.

Note.—The only reliable test for the presence of *Acarine Disease* is the finding of the infective organism itself, within the bees. If reported present, the procedure to be adopted must be determined by the proportion of infected bees in the stock, the season of the year, the age and qualities of the queen, the district and amount of disease already prevalent within it, the proximity of other stocks either in the same or other apiaries. The advice of experts should be taken in estimating the particular importance to be attached to these matters.

GEORGE DEMUTH JOINS "GLEANINGS."

We congratulate "*Gleanings*" on securing the editorial services of Mr. George Demuth, one of America's foremost teachers on beekeeping, who has previously done excellent beekeeping research in association with Dr. Phillips at the *Bureau of Entomology*, Washington, D.C.

ANNUAL SWEET CLOVER SEEDS.

We were pleased to receive from the A. I. Root Co., of Medina, Ohio, a presentation of the annual sweet clover seed in which the veteran leader, Mr. A. I. Root, has taken special interest in popularising it. Seeds in quantities are not yet obtainable commercially, but they are likely to be available in a year or two.

BEE CULTURE IN ITALY.

Inasmuch as our Italian bees are proving to be such a help not only to America, but perhaps to the whole wide world, it is a little strange that we have never heard very much in regard to what the Italian bees do in their native home. The enclosed clipping from the *Cleveland Plain Dealer*, in view of this, should be interesting:—

BEES TO AID SUGAR LACK.

ITALY GIVES RAIL EMPLOYEES UNIQUE JOB.

Rome.—Italy is devising means to alleviate the beet sugar shortage. She has been urged to put more bees at work producing honey.

Italy in 1917 had only 67,000 miles of railways, and at regular intervals along the lines are little houses where the railway employees, signalmen, track walkers, and repair men live. The manager of the *National Institute for Agrarian Assistance* recently recommended that they each be given a hive of bees.

In conformity with the suggestion, the experiment is to be begun at once on the lines in the province of Rome; and, if successful, it will be extended to all the railways of Italy.

The above, if carried out, will certainly result in a tremendous boost to bee culture in Italy. If we knew how many miles apart these stations were to be, we could tell a little better how many bees it would take to cover the whole 67,000 miles. I find we have now only eight subscribers in Italy. Cannot one or more of these eight subscribers tell us a little more about it? And, by the way, cannot the suggestion be carried out, more or less, here, in our own country? If each one of our thousand railway stations, say in country places and the little towns, were once started in bee culture, it might result in saving many tons of nature's sweets.—A. I. Root in *Gleanings*.

MODERN INVENTIONS.

The Duffy-Diehl, Inc., of 19, South Chester Avenue, Pasadena, California, U.S.A., have paid us the compliment by utilising our title design, "Modern Inventions," in their advertising circular for the Macdonald Aluminium Comb, of which they are the American proprietors and manufacturers. The patent rights of this invention in the United Kingdom belong to Messrs. E. H. Taylor, Ltd., of Welwyn, Herts.

"THE BUSY BEE."

The 1921 Special Spring Number of this monthly journal is a delightful publication, the publicity section of which alone is a source of education. The text is profusely illustrated and brim full with excellent hints on beekeeping, fruit growing, poultry keeping, home gardening, etc. "A year's garden worries saved at a cost of half-a-crown," which is the annual subscription, payable to the publishers, Messrs. Bees, Ltd., 175-181, Mill-street, Liverpool.

The Apis Club,

BENSON, OXON.

Report of the Hon. General Secretary to the Second Annual General Conference of Apis Club members held at the Central Hall, Westminster, London, on Saturday, April 2nd, 1921.

The Hon. General Secretary of the APIS CLUB has the pleasure of submitting to the Conference a Report on the conditions of the CLUB since the previous Conference held on May 29th, 1920, also a brief statement on important questions which the present Conference is expected to deal with.

The Scope and Development of our Organisation.

There is a steadily growing appreciation of the educational value of an international beekeeping organisation not fettered by the borders of county or country. Were it not for the enormous work entailed and the expenses needed, also the wisdom of following a natural and gradual process of development, we could profitably have created one or more international scholarships, beekeeping exhibitions, excursions and international conventions. Knowledge knows no geographical boundary and the progress of science and industry is becoming more and more dependent on internationalism.

Within the United Kingdom, beekeeping conditions have undoubtedly the first claim on our interest and work. We have consistently observed the principle of co-operation with existing societies, a strict avoidance of over-lapping in activities or prosperity to our endeavours at the expense of present organisations. We should feel proud therefore of the fact that such aims and methods of applying them, in spite of the adverse beekeeping conditions of the 1920 season, should have won an appreciation resulting in the growth of our direct membership to no less than 917, and that new members continue to be enrolled, also that the number of affiliated societies has increased to 32, representing altogether an aggregate of more than 11,000 beekeepers. In addition, almost every leading beekeeping establishment in the United Kingdom and abroad has a membership in the APIS CLUB. It will be readily seen that such a federation of beekeepers lends itself to real constructive work according to the financial means available, and the hope is thoroughly justified that its future activities will more than justify its existence both nationally and internationally.

For two years secretarial and other expenses of the CLUB have been shouldered by a minority. The donations paid on behalf of the CLUB during the current year to various funds and public educational work exceed those received, which will be duly acknowledged at the close of the second volume of the BEE WORLD. The difference between income and expenditure is considerable, for the simple reason that the membership fee adopted last May does not go beyond the necessary subscription fee to the paper, also because in spite of lack of funds, those responsible for the financial security of the CLUB during its organisation stage did not feel inclined to curtail their co-operative and educational work, even though at a financial loss. No member of the APIS CLUB, however, has ever been liable for more than his or her membership fee.

At the present moment, the Association owning the BEE WORLD on a share basis, in conformity to the recommendations of the Organising Committee appointed by the previous Conference, are also shouldering the financial responsibilities of the CLUB. In view of the fact that it is highly desirable to terminate the present organisation stage next month and formulate a final Constitution to be enforced commencing next June, the Conference is requested, in the absence of a better alternative, to appoint a Committee for effecting this. Miss Annie D. Betts, Mr. J. B. Lamb and Mr. Richard Whyte—the three of whom have rendered distinguished services to the CLUB —are nominated, together with the Hon. General Secretary, for undertaking this task, should this proposal receive the approval of the Conference.

The Conference is not asked to shoulder any financial responsibility, and consequently the financial deficit will be outside its consideration.

The Bee World.

The proprietorship of the BEE WORLD, as the members realise, now belongs to a Public Company of nearly 200 shareholders, practically all of whom are members of the APIS CLUB. Over 1,150 shares have already been disposed of, and applications continue to be received. The improvement in the general financial position leads to the hope that every other member of the CLUB will now join in this share scheme in whatever possible degree. It is expected with the means available that the paper will be issued in future mid-monthly.

Despite past hindrances, the growth in the circulation of the BEE WORLD has been most gratifying, and the moral weight of this fact has been a great consolation at critical times. In addition to tho supply of the paper through newsagents in the United Kingdom and abroad and to members of the APIS CLUB, Beekeeping Societies are availing themselves of the advantage of receiving the paper in bulk at a considerably reduced figure. A Clubbing Offer has also been arranged with tho "British Bee Journal" office, and arrangements will be made with other leading papers in future. It is a pleasure to mention that the BEE WORLD is sufficiently valued as to make the purchase of early numbers a very difficult task, in spite of the high price offered. Advertisers are also appreciating more than ever the medium of such a paper commanding both circulation and quality, and consequently a class of readers who understand the value of and can afford to pay for good articles. Unlike the last, the present Conference is therefore relieved from any worry over the present or the future financial position of the BEE WORLD and is only concerned with its policy, which has been throughout one of educating the public without fear or favour or a desire to flatter and please.

Several overtures have been received from different Associations regarding having the paper as their direct official organ. This would have meant further assistance to us, but at the expense of hurting the susceptibilities and business interests of other colleagues, be they our

The Apis Club -(*Continued*)

friends, pseudo-friends, or unwanted opponents. Consequently such overtures have not been entertained as they have been considered incompatible with our policy of co-operation and expansion and not that of destruction and supersedure which is dictated by commercial opportunism. In the long run, we are not the losers by such a clean policy, which has already won for us staunch friends in all directions.

The Experimental Apiary.

This will continue to be maintained at a minimum of 15 colonies and a maximum of 50, and will serve to provide media for study and tests. Results of observations are published from time to time in the BEE WORLD.

The Library and Museum.

We have now copies of all modern books on beekeeping and a respectable museum of appliances and interesting specimens. Both in and out of season members continue to visit the CLUB and avail themselves of opportunities for study. Our future programme will include a circulating library which should be very helpful to members. Presentations of specimens and copies of bee books will be gratefully received.

Conferences.

In future it is proposed to hold more than one Conference annually. Such meetings are of value in fostering a spirit of comradeship among our members and for discussing important topical questions. These are both of social and educational interest. With greater means, the work of the CLUB will also be developed in other directions.

The Marketing of Honey.

Quite recently the B.B.K.A. have approached both the Scottish and Irish B.K.A.s for the formation of a representative committee to tackle this and other questions that require a united front. This is a welcome move which we hope will lead to successful results. Whether our co-operation as a society will be required or otherwise, it is hoped that the efforts to increase the marketing facilities for the British honey producer will receive a whole-hearted support from our members. A constructive discussion on this subject matter by the Conference may be helpful.

Legislation for Bee Diseases.

The Bee Diseases Bill, which was introduced in the House of Lords on December 20th, 1920, is temporarily shelved, together with other Bills involving the expenditure of public money. It is expected, however, to appear in the House of Commons so soon as the economic policy of the Government permits, when the Bee Advisory Committee, which the Ministry of Agriculture proposes to set up, will be convened. The function of the Committee (which will consist of 16 members representative of various sections of the Craft with but two nominees of the Ministry) will be to advise on all questions of Apiculture, including the question of Legislation in regard to Bee Diseases. In response to an invitation from the Ministry, the Conference is asked to nominate two representatives for one year term to serve on that Committee, directly it is convened, and to grant a mandate to them in relation to Legislation for Bee Diseases.

LEGISLATION IN AMERICA. The Foreign Sales Manager of a leading beekeeping establishment in the United States writes to us in a letter dated March 25th expressing his great surprise that some British beekeepers are led to imagine that Legislation has done harm to America. Comment would spoil his concluding paragraph, which reads as follows: "Generally speaking, Legislation in America has been distinctly favourable in bee culture, even to the extent of prohibiting spraying to fruit trees during blooming time."

THE PASSING OF FRANZ RICHTER. We are grieved to learn of the death of Franz Richter, the well-known Austrian beekeeper, who died from the effects of starvation through the terrible shortage of food in Vienna, on December 1st, 1920, at the age of 73. He was good enough to send to us in English for publication an article which was his first and last to the BEE WORLD. This, together with a biographical notice, will appear in a subsequent number.

AMALGAMATION OF ITALIAN BEE PAPERS. In the last issue of *L'Apicoltore* (December, 1920), edited by the distinguished Italian and international beekeeper, Dr. Vincenzo Asprea, the following notice in Italian appears from the pen of the editor: "After more than half century of propaganda work *L'Apicoltore* ceases to exist with this its last issue. It is being fused with *L'Apicoltura Italiana*, the official organ of the *Federazione Apistica di Ancona*. In this journal I will continue my work of examining and reviewing for the benefit of fellow beekeepers all the best which is brought out all over the world in bee matters.

"To old friends, therefore, thanks and farewell."

Since the appearance of this notice we have received numbers of *L'Apicoltura Italiana* which certainly possess the high standard of journalism which we were led to expect. We offer our worthy contemporary every perfect wish.

ADVERTISING STILL PAYS. A Kansas man is convinced that advertising pays. He advertised for a lost $5 bill, and a stranger, who had picked one up on the streets, read the advertisement and restored the bill to the advertiser. A few days later, while looking over a waistcoat he had left off, the original lost bill was found in a pocket. He says advertising pays a hundred per cent.—*The Beekeepers' Item*.

MANAGEMENT FOR INCREASE PROFITABLE. Writing to the *Australasian Beekeeper*, I. F. Munday discusses the question of the most profitable course: keeping more bees per hive or keeping more colonies. In his experience Management for Increase under Australasian conditions is the more profitable.

THE APIS CLUB AND LEGISLATION. The Second Annual General Conference of the *Apis Club* members, which was presided over by Mr. J. B. Lamb, Chairman of the *Middlesex B.K.A.*, on April 2nd, was a great success. The Secretary's Report was unanimously adopted except for the appointment of a Committee for drafting a final Constitution to the Club to operate commencing June, 1921. The Committee was enlarged and unanimously elected as follows: Miss Annie D. Betts, B.Sc., Messrs. A. F. Harwood, W. Herrod-Hempsall, F.E.S., J. B. Lamb, R. Whyte, and the Secretary, A. Z. Abushâdy.

With reference to the BEE WORLD, the Chairman appealed to every member of the CLUB and others to share in its proprietorship in whatever possible degree, so that every one of its readers may be a producer as well as a consumer and ensure for the paper the greatest possible prosperity. One or two shares taken per reader would amount in the aggregate to a large number, and provide adequate capital for guaranteeing continued success.

The question of Legislation took over an hour in deliberations from the Conference, the discussions conducted freely and in the most amicable manner. The principle of Legislation was unanimously accepted, and the following resolution adopted by a large majority: "That this meeting, approving of the principle of legislation with regard to bee diseases, do accept the invitation to appoint two members to the Advisory Committee of the Ministry of Agriculture to advise in matters apicultural generally and in particular with regard to the administration of any measure that may be enacted affecting the Craft."

Four candidates were nominated for the election of two representatives on the Committee for a year, the majority of votes were given to Messrs. A. Z. Abushâdy and J. B. Lamb, who were accordingly appointed. It will be seen from the terms of the above resolution that the representatives of the *Club* are expected, in relation to Legislation, to advise not only on the terms of the Bill when this is brought for discussion before the *Bee Advisory Committee*, but also on matters affecting its administration, on which special emphasis is rightly laid, since even the most acceptable measure would fail if wrongly administered.

With a view to ascertaining the exact criticisms and amendments that members advance in connection with the present Bill, the Secretary of the *Club* invites those members *opposed* to the Bill to meet him at the offices of the *Club* at Port Hill House, Benson, Oxon, on Saturday, May 7th, 1921, at 2.30 p.m. The nearest railway station to Benson is Wallingford, G.W.R. Those who cannot attend are requested to forward their criticisms and constructive proposals in writing *for preference*. No correspondence, however, could be entered into, the object of this request being to ascertain the views of those opposed to the *Bill*, so that the representatives of the *Club* on the *Bee Advisory Committee* may be able to render the best possible service to their fellow members, and to be assisted in discharging their duties, when the call comes, without fear or favour.

HONEY IMPORTS IN THE UNITED KINGDOM.

Following is the total value of Honey Imports in the United Kingdom during the year 1920, which amount to nearly a quarter of a million pounds sterling, *i.e.*, at the rate of over £600 per day on an average:—

	£
January	38,099
February	15,543
March	18,963
April	7,854
May	15,183
June	30,493
July	2,460
August	27,905
September	34,947
October	14,234
November	8,187
December	10,333
Total	£224,201

DR. MILLER'S MEMORIAL.

Members of the *Apis Club* attending the April Conference, to whose notice the Memorial Fund for the late Dr. C. C. Miller was brought, were highly enthusiastic about it. Already subscriptions have been received which will be acknowledged in a following number. The concensus of opinion is to keep 75 per cent of the receipts for the memorial in the United Kingdom and to forward the balance to the American Committee. We look forward to *everyone* of our readers to contribute something in memory of the great international leader who indeed belonged to the world generally.

BEEKEEPING IN JAPAN.

Writing to the *Beekeepers' Record* for April, 1921, on Japanese Beekeeping, Mr. H. Watanabe, President of the *Central Japanese Beekeeping Society*, remarks: "Although beekeeping in Japan has quite a long history, it was not developed for a long period. This may be attributed to two prominent causes: One, that the native bees are composed of the Oriental races, and, strange to say, it is quite impossible to improve these by crossing with their superiors, the European races. The other cause is that the beekeeping industry in Japan has generally been in its primitive stage.

However, during the last fifteen years, owing to the awakening on the part of beekeepers themselves, they have engaged in investigating modern methods of beekeeping, and also importing the superior races of bees from foreign countries and making them thrive in our country, with the result of not a small progress in general." He goes on to say that according to the statistics compiled by the Japanese Government at the end of 1918, Japan has 243,685 colonies of bees, of which 165,491 are of the Oriental races, while the rest, namely, 78,194, are of foreign origin. Beekeeping in Japan "is practised from the southern part to the north, for as to the relation of plants to the period of activity on the part of the bees themselves, the northern regions are far better for beekeeping than the warm southern ones." In Japan, "several sorts of magazines concerning beekeeping are published now," but Mr. Watanabe credits the *Friend of Beekeepers* with the largest circulation.

OUR ESSAY COMPETITION.

Members of the *Apis Club* are invited to an Essay Competition on "The Peculiarities of the Carniolan, Dutch and Italian Races of Bees that require Special Management." Size of essay: not to exceed 500 words or about half a page of the BEE WORLD. The Editor's judgment shall be final. Three prizes offered for the best three essays, namely, £1, 10s., and 5s. The prize-winning essays are our copyright, whether published or otherwise, and we do not undertake to return any essay received. All competition essays must reach our office not later than May 15th, 1921.

THE ABERDEEN RESEARCH.

As we go to press, the *Transactions of the Royal Society of Edinburgh* (Vol. LII., Part IV., No. 29) reach us, containing four papers by Dr. John Rennie and his associates on *Acarine disease*. In following numbers of the BEE WORLD we shall examine in detail these interesting and valuable reports, which signify the indebtedness of the scientific world, and beekeepers specially, to the work of these investigators. A limited number of copies are now available for sale by Messrs. R. Grant & Son, of 107, Princes Street, Edinburgh, at 9s. 4d. per copy, post free. Our readers are strongly recommended to purchase the *Transactions*.

WHAT BEES LIKE.

Perhaps the most springlike of all sounds and sights is the presence of many bees in a flowering bush; and it is the proper function of a gardener to make arrangements for securing this spring-time pleasure. What is the highest attraction for the bees at this early date?

I know at any rate the bush that in my experience of this year hummed the loudest. It was a giant bush of the flowering currant in a Herefordshire garden. There were no adjacent hives, and the bees, which were almost absurdly eager to rifle the flowers, must have caught the scent from a long distance; and they staggered off very heavy with the quaintly tinted pollen.

One would like to see such things taken note of in garden literature. It would not be difficult to make a list of flowers which are the best lures for living things: for birds, for mammals, for this insect and that: for wryneck and squirrel and dormouse; for the hive bee and humble bee, for the peacock butterfly or the night moths. So should our garden be always twice blessed. -W. B. T. in *The Daily Mail*, March 27th.

BEEKEEPING AND FRUIT-SPRAYING. Most orchardists keep bees, in order to ensure the cross-fertilisation upon which so many trees depend, and it is a great pity that a certain number of the people who keep both bees and orchards contrive successfully to poison the former at the moment of their most successful activity. Yet the facts are very simple and admit of no doubt. In the spring of 1920 it was reported to the Ministry of Agriculture that the greater part of several apiaries had been wiped out because owners of neighbouring orchards had sprayed blossoming fruit trees with arsenate of lead. To give one instance. Swanley Horticultural College in Kent lost half its hives and the rest produced no honey. Most of this spraying with lead arsenate is done with the idea of destroying the larvæ of the Codling Moth, but this is a very foolish endeavour because the eggs are laid on the foliage of young shoots and only the hatched larvæ reach the fruit. The use of a lead spray during blossoming season may serve to stop the setting of the bruit but it will not destroy the Codling Moth. The Ministry of Agriculture advises that lead arsenate should never be sprayed on open blossom, owing not only to the danger of poisoning bees but to the possible effect of this poison upon the open bloom. If such spraying is persisted in, it may be necessary for an Order to be issued making the use of lead arsenate illegal at certain times of the year. Just now our bees are in anything but flourishing condition. Isle of Wight Disease has taken a very heavy toll of British apiaries and it is more than merely unwise to run risks with the poor remains of the country's hives. Every owner of orchards or plantations know that the honey bees are the most effective of all insect workers and that he must depend in no small measure upon their efforts for the reward of his own. Looking at the question from the other side, the beekeeper deserves well of his country because at this present moment we consume millions of pounds of honey that we do not produce, and the beekeeper must be protected against the reckless fruit-grower who uses a poisonous spray that will certainly be of no service to his trees and is bound to be destructive to his neighbour's hives.—Ministry of Agriculture and Fisheries *Weekly Service*, March 12th, 1921.

ANTI-SWARMERS BEWARE! If you have not studied your *Daily Mail* carefully, read and learn:—

"Celestial phenomena rare in combination are attending this remarkable spring. All over Europe astronomers are searching the night sky for the first sign of Pons-Winnecks, the great comet now rushing towards earth. On Friday in next week (April 8th) the moon, passing between the earth and the sun, though not totally obscuring it, will provide the first annular eclipse visible in these islands for 63 years.

"A hundred years ago comet and eclipse would have given rise to perturbation and foreboding. To us they are merely interesting 'phenomena.' We should like to know more about them; most of us wonder if by any chance they mean a fine summer. So far the scientists are not very helpful, and the assumption is that the influence of 'phenomena' on our terrestrial weather is remarkably slight. The nearest approach to a 'general idea' running through weather conditions is the alternate-cycle theory named after Professor Brückner, of Vienna. On that theory, last year was the bad end of one cycle of 35 years, and a new cycle of years steadily improving up to a perfect summer should now begin."

Perhaps this accounts for our first swarm issuing from a Dutch skip on March 25th, 1921. The balance of prediction is in favour of a hot summer and altogether good honey and fruit crops. Favourable weather reports are being received from nearly all parts of the world.

NAMEPLATES. We have received from the Stimur Manufacturing Co., of Macdowall Street, Paisley, presentation specimens of artistic name plates suitable for advertising by fixing to hive frames for nuclei and colonies supplied, and to general beekeeping appliances. Commercial beekeepers and appliances manufacturers will find such name plates which are made to order at very reasonable figures in quantities—highly attractive and effective for publicity purposes

The Arena: Letters to The Editor.

Criticism is a disinterested endeavour to learn and propagate the best that is known and thought in the world.—MATTHEW ARNOLD.

BEE DISEASES LEGISLATION.

SIR,—It really is a pleasurable duty to renew my subscription to the *Apis Club*. It is little I am able to do financially, but if every *live* beekeeper rallied to the cause, our position would never be assailed, at all events not without some sting.

Two or more years ago I bought from a "friend" who has kept bees for 30 years two I.W.D. stocks (the disease was in a very early state). The result was, after a gallant fight, that I sulphured the bees. I restarted last year with one nucleus which built up and wintered well. Now I have eight stocks. But alas! Another "friend" got a diseased stock from a member of the . . . . Association, who is his brother-in-law! I pleaded with him to put it under, and offered him my first swarm. He was adamant. As may be expected, his nucleus, instead of developing, steadily dwindled and this autumn one of my stocks began to rob his, and I was forced to put them under. Need for Legislation? I dare not answer.

Wishing you full success in your deserving venture.

Yours faithfully,
Chesterfield. A. F. BENNETT.

THE INFLUENCE OF THE MOON ON HONEY STORAGE.

SIR,—May I enquire whether there is in the West any belief in the influence of the moon on honey storage? The local belief (*i.e.*, in Ceylon) is that honey is only found on dark nights and not on moonlight nights.

Yours faithfully,
C. DRIEBERG, B.A., F.H.A.S.
Peradeniya, Ceylon.

STATE SUPERVISION OF APIARIES.

SIR,—There is reasonable justification for apprehension on the part of beekeepers regarding the nature which the proposed State Supervision of Apiaries will take. Experience has taught them again and again to doubt the wisdom of "departmental methods," especially when blessed with unlimited powers.

I enclose a cutting from the *Times* for September 8th, 1920. Is this the kind of thing we would have to put up with if beekeeping came under the Ministry of Agriculture?

Yours faithfully,
ROBERT S. DOBBIE.
Sutton, Surrey.

[Following is the cutting to which our correspondent refers.—ED.

DEPARTMENTAL METHODS.

TO THE EDITOR OF "THE TIMES."

Sir,—Will you allow me to give an example of the needless waste of public money going on in Government Departments in the case of the Board of Agriculture?

A well-known gentleman whom I will call Mr. Smith rents a small estate in Surrey, and employs a lad to assist in the farm work, the produce of which is not sold, but used by the household. The lad is 16 years old, and was quite satisfied with his wages, raised to 20s. a week a few months ago. Under the Order of the Agricultural Wages Board, published in the *London Gazette* on May 21st, 1920, lads from 16 to 17 years of age in Surrey are in future to be paid 25s. a week for 50 hours' work, and also to be paid for overtime. This Order was unknown to Mr. Smith, and, instead of informing him by letter of its existence, an inspector was sent down in a hired motor to Surrey on June 19th, who, without previous notice, presented a formidable mass of official papers containing minute details of the overtime and additional wages due to this lad. As the demand dated back several months before Mr. Smith had taken the place, before the lad had attained the age of 16 years and before the Act had come into force, the inspector was asked who authorised the demand and how he had obtained his information. He replied that the Board had received an anonymous letter, upon which he had motored down previously, and spent some time picking up such information as he could glean without informing Mr. Smith; that the demand came from the Board, and serious trouble would ensue if it were not paid. Payment was refused, as the facts were incorrect, no written request for payment had been made, and it seemed doubtful if the Act applied to Mr. Smith's holding. A letter was sent to the Board of Agriculture by Mr. Smith, stating these facts, and that whatever was legally due would be paid. A little later another inspector was sent down in a hired motor, who admitted that errors had been made, and stated that half the sum demanded would be accepted. This was accordingly paid to the lad, much to his delight.

The whole of this annoyance to Mr. Smith and cost to the taxpayers for clerical work and several journeys by car (one of the inspectors said he spent £50 to £60 a week in car hire) would have been saved by a letter giving official intimation, and asking Mr. Smith if the statements in the anonymous letter were correct; but this is not the end of the story. A week later, another inspector called upon Mr. Smith, in an officially hired car, asking him for the return of a printed form which requires detailed information of the crops, cattle, and garden produce on the holding. The return, duly filled in, which was ready for the post, was at once handed to the inspector. No doubt these country drives in a comfortable car, sometimes with ladies, as in this case, are very pleasant, but I much doubt whether the taxpayers of the country will appreciate the spending of their money in this way.

I am, Sir, your obediently,

Arthur W. Chapman.

3. Palmer-street, St. James's Park, S.W.1.]

THE STANDARD OF BRITISH AND AMERICAN BEEWARE.

SIR,—Nearly every beekeeper I have met within the last twelve months seems to be complaining bitterly of the poor quality of goods now being sent out by some of the well-known bee firms in this country. I am sorry to say that I must share the same opinion with them, and unless something is done quickly to improve the present standard of goods sent out, all we shall have to do will be to patronise the American firms who are so anxious to obtain a footing in this country.

Naturally after a war such as our country has passed through, we can hardly expect to have quite the same standard of quality as existed in pre-war days, but still there is a limit to everything. I will take, for example, the *frames* which have been supplied this past season. They are at least three times the price and certainly more than three times worse in quality. In fact, I can truthfully say that it is a very difficult proposition for any beekeeper to fit up these frames quite true, and some of them have been simply awful. Now, on the other hand, I bought some standard frames from an agency of the A. I. Root Company, the well-known American firm, and these were cheaper and even better quality than the pre-war frames supplied in this country by our own bee firms. If such is the case, what are we to do? We all like to support home industries, but if the home firms are dead to the fact that they must also support us by sending out good quality stuff, then all we can do is to buy our goods, which are cheaper and better, of the American firms.

Take again the *foundation* and the honey extractors supplied in this country. To deal with the foundation I have found it to be a source of continual trouble to get the bees to touch it. On the other hand, when using Root's and Dadant's foundation, you could not keep the bees off it, and several beekeepers who have this year visited my bee farm have been surprised at the even combs drawn out on Root's foundation and not a sign of drone comb. Now I say that this is not what it should be, and I feel convinced that unless our home firms improve the quality of their goods, a great many orders will go to the American firms. As regards the *honey extractors*, I have tried practically every English honey extractor on the market, but could not get one to suit my requirements, till I had one from the A. I. Root Co., of Medina, U.S.A.

It is pleasing to note that some of our firms have at last taken up the cause of the larger frame, a step which I think has been too long delayed. I have not the least doubt myself that the British Standard frame is slowly but surely losing ground. Langstroth hives are now finding favour in this country, but the question is where are they to be obtained unless we go to the American and Colonial firms or their agencies in this country.

It is time that our British firms treated beekeeping as a commercial industry, for it must be clear to them that only hives which can readily be shifted about are fitted for the commercial beekeeper. The W.B.C. hive is a favourite of mine, but how any number are to be shifted about on a lorry is beyond me.

I strongly advise our home firms to give the Langstruth hives their consideration, otherwise they will lose a considerable amount of business. Where we order our hives from we generally order our sections, frames and foundation, etc. Therefore if our own firms cannot supply our requirements for the larger hives and frames, they will most probably lose our orders and the American firms will get them.

One cannot but be struck with the quality of the American and Colonial goods; but being an Englishman myself, I naturally think that English firms, if they like, can go one better and turn out better stuff than the best American stuff on the market. Let us hope they will try and do so by next season.

Yours faithfully,

JULIAN E. LOCKWOOD.

Hunstanton, Norfolk.

[The trade in this country has to put up at present with considerable industrial difficulties which, no doubt, Mr. Lockwood appreciates. Conditions in America are decidedly far better. At the same time, this is no excuse for some British manufacturers for giving the standard of their products the last consideration. We have not failed to observe and to encourage improvements, and if the standard of British products is still in the rear, the public and their guardians are not the less guilty, because they have been traditionally championing cheap products and hardly stimulate the interest in advanced preparations amongst the rank and file of beekeepers. For it is quite obvious that appliances produced by our manufacturers during the autumn and winter months are amongst their best make, because they are not rushed with the work, and it will go a long way in solving the difficulty to educate the average beekeeper to look ahead and order his appliances for the following season as early as October, if not even earlier.—Ed.]

NEW ZEALAND HONEY.

SIR,—I shall be much obliged for further information relative to New Zealand honey, especially in regard to its fitness for bee feeding.

In remitting my membership fee to the *Apis Club*, allow me also to enclose £3 4s. 2d., which is the discount I have had off various bills (from being a member of the *Apis Club*), which I think must go towards the *Club* funds this year.

With all good wishes and grateful thanks for the work which you have done.

Yours faithfully,

(MISS) F. M. CARDALE.

Headley, Hants.

[We much esteen the great kindness of our correspondent. Some beekeepers may wonder why we should worry at all about the standard of the literature when the Craft in general, numbering at a recent estimate over 40,000 (the Scottish *B.K.A.* and its affiliated societies alone have a membership of more than 5,000) are apathetically and selfishly interested in acting either as wise critics or speculators instead of active collaborators. This, in a sense, may be a justified observation, but the foregoing is a typical specimen of that genuine interest and noble co-operation which sustains us in our uphill struggle.

Regarding the fitness of New Zealand honey for bee feeding there are many beekeepers in this country who have exclusively practised its use in the fall as well as early in the spring for bee feeding, with quite satisfactory results. We cannot do better in supplying further information on New Zealand honey than quote the following article which appeared in the *Auckland Weekly News* for July 15th, 1920:—

Among New Zealand's primary products which, owing to their superior qualities, are highly appreciated, and in large demand in oversea markets, our honey occupies a prominent position. It is more than thirty years since it first came into favourable notice in Britain, since when the demand for New Zealand honey has far exceeded the supply. In fact, if we were to send the whole of our annual output it would not, by a long way, satisfy the demand in Britain alone. It is generally acknowledged in the Homeland to be the best honey that reaches their markets from outside, and what is satisfactory, it fetches the highest price. Much of the honey raised in England, which in the total quantity is not large, is of a fine quality, but not superior to the bulk of our honey, as is shown by the fact that the latter has frequently been sold as English honey.

Until some six years ago, New Zealand honey exported to England was sold through brokers on the open market; it then lost its identity with New Zealand, and the bulk of it was used to blend with, and enhance the value of, inferior honey, while much was retailed as the best English honey. At that time our producers were receiving on an average 3¼d. per lb. net, while it was being sold in England at from 10d. to 1s. In 1913 a few of our progressive beekeepers formed a Co-operative Association, termed *The New Zealand Co-operative Honey Producers' Association*, the head office of which is now in Auckland, with depots in the chief beekeeping centres. This Association, immediately after its formation, entered into a contract on behalf of New Zealand beekeepers, with an English-Colonial institution to supply any quantity of honey up to 300 tons annually for the English market; this limit has since been extended to any quantity. One of the conditions, and a very important one, was that it should be retailed in Britain as New Zealand honey.

As to the circumstances in favour of our producing such superior honey, they are in the first place natural, and in the next place, artificial, to some extent. The climate, including the average temperature and rainfall, together with the splendid quality of our indigenous and exotic honey-flora, all tend toward the production of the finest honey the world produces. In fact, it is very doubtful whether there is any country better adapted for commercial beekeeping than New Zealand. These constitute the natural advantages, and the following are what may be termed the artificial conditions, which are no less needful than the former for the production of a perfect honey. Without the proper harvesting and conditioning of honey after it has been taken from the hives the finest in the world may be spoiled for marketing purposes. New Zealand, it may here be remarked for the benefit of consumers, has the strictest regulations controlling the quality of honey placed upon the market of any country in the world, and these have been welcomed by the producers themselves. Our Government official standard for honey is higher than that of any other country, and this is the only country having official graders whose duty it is to see that no honey is exported that does not come up to the standard. Moisture in honey alters the character and quality of honey according to the quantity it contains. All honey contains more or less moisture, about 16 to 17 per cent. when well ripened, varying to as much as 25 per cent. or more when first gathered in moist weather. The average moisture content of 51 samples gathered throughout New Zealand for the purpose of testing by the Government analytical chemist was 16.43 per cent., which indicated well-ripened honey, and a low water content. Honey containing up to near 18 per cent. of moisture will not be out of the way, but when the water content is up to 20 per cent. or more, the honey is usually very thin, or of a soft granulation; the firmer the granulation the less water content. When over 20 per cent. it is doubtful how long such honey will keep free from fermentation.

When our official maximum water content allowed in honey is compared with that of other countries, it will be at once seen why, in one respect, our products should be superior to others. In America, and Australia, for instance, the water content allowable is 25 per cent., in New Zealand no honey is allowed to be exported having a density or specific gravity less than 1.42, which indicates a water content of 17.40 per cent. Pretty well all honey exported is of a much higher specific gravity than the above.

Furthermore, in our regulations our honey passing through the graders' hands loses many points if it has not been properly matured—that is, clarified from all foreign matter, such as specks of wax and pollen grains, that form an unsightly scum on the surface when granulated. So far, only honey for exportation has been dealt with, but the same applies to that placed upon the local market, which has passed through the *New Zealand Beekeepers' Co-operative Association*. It will now be understood why New Zealand honey excels.

Regarding the present status and future prospects of commercial beekeeping in New Zealand, it was recently estimated by Mr. I. Hopkins that the total output of honey for the season ending March of last year was, at a low calculation, 1,200 tons, while the director of the apiary section of agriculture made it much more. Its value was in the neighbourhood of £100,000. Referring to the figures furnished by the manager of the *Co-operative Honey Producers' Association*, through which nearly the whole of the honey export trade is conducted, the quantity exported by the association for 1919 was 1,440,000 lb. (over 640 tons). The net returns to producers for 1917 and 1918 was 8d. per lb. for prime grade honey, but had shipping space been available when top prices were going in England, the returns would have been higher. The final accounts for 1919-20 have not yet been received from Home, but the association has advanced 6d. per lb. to the exporters. The demand on the local markets is increasing rapidly, so that everything is satisfactory in that respect.

As to future prospects of commercial beekeeping in New Zealand, there has been a vast increase in the beekeeping ranks during the past three years, especially by returned soldiers, and the increased output from these will begin to tell next season, when it is confidently expected that there will be 50 per cent. more honey produced in the Dominion than in any previous year. The prospects before beginners are excellent, in fact, could scarcely be better.]

A METHOD OF WINTERING.

SIR,—It may interest your readers to learn of the following method of wintering practised in Japan by one of my friends who lives in a mountainous cool district that has become known as the Nippon Alps region. His is a method of "*combless-candy-wintering*."

In view of the extreme cold in his locality it struck him that a wintering cellar at the side of a mountain would be ideal. He made his selection, but against one's expectation he would not winter on combs.

His experience was as follows: On the 20th of December, 1919, he examined his colonies and found that breeding had stopped and little stores were left for the bees. He shook each colony in a special combless hive adapted to take a little over 6 lbs. of candy for their winter food, the average weight of bees being from 2 to 2½ lbs. per colony. He afterwards went to the south sea region for his health, not returning to the north till the 9th of April, 1920, to find all his colonies in splendid condition, but with little candy left (less than half a pound per colony on an average). During all these weeks they have never had a cleansing flight, but it must be remembered that the proportion of food which they consumed during all this period was comparatively small. The proportion of dead bees in the hives was indeed very small. When rehived on drawn out combs, some of which provided with stores, they worked very diligently in the manner of a hived swarm.

My friend claims the following advantages for his method of wintering in extremely cold countries: (1) The preservation of the life of the bee by not spending it in food storing and wax secretion in the fall; (2) the bees cluster more snugly than when provided with combs, and the warmth of the cluster appears to be more preserved in this way; (3) less stores are consumed; (4) economy in cellar space; (5) the favourable influence on the bees when rehived on combs at the beginning of the working season.

Yours faithfully,
YASUO HIRATSUKA.

Tara, Gifu-Ken, Japan.

THE METAL FOUNDATION.

SIR,—We are much interested in the efforts to produce a workable metal foundation and have no doubt in time beekeepers will appreciate that bees could be compelled to work on bare metal under intelligent conditions of management. The relative merit between "moneycomb" and metal foundation will have to be proven, however, and this will take some time.

If there is anything in this section of the United States that we, in our humble way, may be able to do for you, it would give us great pleasure to be of service.

Yours faithfully,
C. B. ANDREWS.

Pasadena, California, U.S.A.

"THE SPIRIT THAT SUSTAINS."

SIR,—I enclose my application for five shares in Adminson Ltd., with regret that I am unable to support your splendid efforts to a larger extent. I sincerely hope that the BEE WORLD will be maintained at its present high level and that it will soon be commercially an established success, as it is literally. Please accpet my appreciation of your transparently unselfish labours on behalf of the Craft in general and my admiration of your strict justice in all your editorial comments.

Yours faithfully,
B. J. FRANCIS

Shoeburyness.

[The above kindly message is typical of scores of encouraging letters that reached us at a time when those prejudiced to the cause of the BEE WORLD were struggling hard to break our fellowship by all sorts of mean misrepresentations and discrediting suggestions, not the least disgusting feature of which is the conduct of such a hostile campaign under a friendly guise.—Ed.]

THE LARGE SQUARE FRAME.

SIR,—Although I have no experience of the new *British Deep Standard Frame* (14in. by 12in.), I can speak highly of another large frame which is practically identical with it. One of my hives fitted with twelve of these frames (14in. by 14in.) houses by far the best colony in my apiary.

So far, I have had no more difficulty in manipulation than with ordinary standard frames. I practice, however, both bottom and top spacing, using for the former bent tin strips correctly curved and tacked in exactly similar positions, at the lower portions of the side bars. By having a division board at each end of the brood chamber, I manage to get the frames to fit fairly tight.

Amongst my reasons for trying large frames was my eagerness to stop swarming and to provide more winter stores. My first three frames I made by fixing together the standard and half standard frame side pieces by means of a piece of wire sunk into edge of side pieces to hold them together firmly in line; and by using an ordinary W.B.C. standard brood box and a rack for shallow frames on top I got my depth fine.

Whether it is any advantage, I do not know; but this hive held its drones almost three weeks later than the others carrying standard frames. On October 22nd the bees were flying quite as strong as they did in July, and quite ten per cent. were bringing in pollen which seemed to be mainly from the "Evening Primrose." But it was too cold to open the hives to see whether the queens started laying again, after ceasing during September on account of wet days and frosty nights. Anyway, they have had a good chance of going safely through winter.

Yours faithfully,
R. PARRINGTON.

Dent, Yorks.

IMPORTED QUEENS.

SIR,—Referring to your remarks on page 28 of the BEE WORLD for June-September, I beg to state that all Bozzalla Queens supplied to the British public and to the British Government were *tested* queens.

Bozzalla Queens are supplied to customers in accordance with the conditions laid down by the *American Bee Journal*, and are guaranteed to conform to the specification of this journal as "Tested three banded Italians." No untested queen has ever been despatched to a customer from the Bozzalla Queen Rearing Apiaries.

It is possible, though highly improbable, that a tested queen imported into this country starts off as a drone breeder. In most cases the customer has failed to notice that the queen he sees laying drone eggs is not the one he imported and introduced to the colony. In a few rare cases the queen has been injured during transit or after arrival. Such queens usually die during or shortly after introduction, and very seldom survive to lay only drone eggs. In the majority of cases a young fertile queen either starts laying worker eggs shortly after introduction or she dies or is killed.

Yours faithfully,
H. M. STICH.

Paisley, Scotland.

SCOTTISH BEEKEEPING.

SIR,—As a Scottish beekeeper I was much interested in Dr. Newbigging's *"Expeditions" Hive* in view of the scientific and economic principles on which it is based with particular regard to Scottish beekeeping.

The same motives have inspired me to evolve a practical hive to work either 14in. by 8½in., 16in. by 10in., 14in. by 11¼in., 14in. by 11½in., or 14in. by 12in., brood frames, without separate distinct inner chambers, also arranged for heather-going, quick confinement of bees, etc.

I have, besides, a number of other ideas which I hope to work out in connection with the hive, combined bottom *or* top float feeder of large capacity, heather honey press, and single unit super for sections *or* extracting combs, thus doing away with the need for a double range of appliances.

I would lay it down that one aspect of progress in apicultural practico is that, *consistent with full service, to use as few appliances as possible, and to make as many as possible serve two, or more, purposes.*

As a heather man I am particularly anxious to try both the Metal Foundation and the Metal Comb, as the heather beeman can never accumulate a stock of drawn out comb to be used year after year. If he sells in "cogs" or sections his heather honey, he loses or sells his comb; if he presses his heather honey, he loses his combs. Should success finally crown the efforts to produce better metal combs and metal foundation, the heather beeman would therefore immensely gain, through being able to utilise the extractor.

I would like to put in a plea for that much abused 17in. top bar on brood frames and indicate where I think a top bar 15½in. long would be better.

The 17in. top bar allows a space of about 1in. between the inner and outer walls of the front and back of a brood chamber (single-walled type) which can be packed with cork dust or other heat insulating material; the 17½in. top bar of the 16in. by 10in. frame effectually prevents any such packing.

On the other hand, the 17in. or 17½in. top bar on super frames is a hindrance to getting in packing material round the super crate, as that has to be about 18in. long to accommodate such top bars; the 15½in. top bar is quite long enough, and would still cause a projection sufficient for gripping and removing purposes.

Yours faithfully,
JAMES B. BALLANTYNE.

Glasgow.

THE WEIGHT OF THE BEE IN RELATION TO FLIGHT.

SIR,—Miss Betts' estimates (p. 35) of the weight and volume of a bee seem reasonable, and her figuring is correct. It would therefore appear that, while there certainly is a decrease in weight when a bee inflates her tracheal sacs, this decrease cannot amount to more than .02 per cent.—admittedly inappreciable.

In apologising for questioning the assertion without making the necessary calculation, I must state that the inability to fly, of a suddenly dislodged bee, still remains, to my mind, without adequate explanation.

Miss Betts says a bee "inflates her sacs . . to provide for the better aeration of her blood. . ." According, however, to R. E. Snodgrass, Bureau of Entomology, Washington (A.B.C. and X.Y.Z. of Bee Culture, 1917, "Anatomy of the Bee"), "oxygen is carried" (by the tracheal tubes) "directly to the cells that use it, and the blood . . is relieved of the work of distributing it." There is obvious disagreement here.

But in any case, granted that extra aeration of the blood is necesary to continued flying, this does not prove that normal aeration would actually inhibit the action of the wings. A running man has to breathe deeply, but he can start to run even if he has not breathed at all for the previous minute.

Will Miss Betts give this question further consideration with a view to finding the correct physiological explanation of what seems to be an established fact?

Yours faithfully,

DELTA S.

[Miss Betts comments on the foregoing letter as follows:—

I am much obliged to "Delta S." for calling attention to my errors, and must apologise to my readers for having made them. It was a bad slip to say that the bee "aerates her blood" by filling the tracheal sacs. The facts are much more probably as stated by Snodgrass; though I do not know whether any proof has actually been given that the blood of the bee cannot carry oxygen.

It is also obvious that the absence of extra air from the sacs cannot be the main reason why a suddenly-dislodged bee cannot at once fly. On further consideration, I think that it is likely that the bee, like any other flying machine, can fly only when in a certain *attitude* (relatively to gravity). When a swarm, clustered on a high bough, is shaken off, and the bees fly up again to cluster, it is noticeable that some fall further than others before they are able to fly. Moreover, the queen does not by any means always fall further than the bees (else hiving swarms would be easier than it often is). May it not be that *the attitude of the falling bee determines the length of her fall;* and that the queen, being generally tail down while on the cluster, often attains the flying attitude sooner than do those bees that (for example) started to fall upside down?]

PROGRESSION OR RETROGRESSION?

SIR,—May I intrude on your valuable space once more to reply to the criticisms on my letter under the above heading, which appeared in the BEE WORLD of February. I have neither the time to spare nor the inclination to fill the paper with a lengthy discussion, and will endeavour to make this letter clear enough, so that more time need not be wasted, and the inclination to personal references prevented. I hope Mr. Manley will take the hint. If he is still genuinely interested in knowing what my beekeeping experience is, I will give him the information that, with the exception of the first two years, when I had no more than a dozen hives, *I have made my bees keep me and my family, with no other source of income.* Can Mr. Manley say the same?

Taking Mr. Manley's comments in the BEE WORLD of March, he starts with a reference to the difference in the climatic conditions of America and Britain. This is so obvious, that it is useless labouring the point, hence one might deduce that if one pattern hive was suitable in the one country, it might not be at all suitable in the other. But I do not intend to argue along these lines, for those readers of the BEE WORLD who are also constant readers of the American bee papers, will recollect that many articles have appeared over a lengthy period, in most, if not all, of which the belief is maintained that properly arranged packing of hives will be greatly beneficial in all locations.

Perhaps before going further, I might, with some advantage, clearly state my reasons for first calling the attention of readers of the BEE WORLD to this subject. They are as follows:—

During the past five or six years, many people have taken up beekeeping, to whom the science was utterly unknown previously. They knew honey was produced by bees, and that bees could sting, and that was about all. Now many of these people have the making of good beemen, and I am repeatedly asked for advice on various subjects, the majority of which have some reference to articles which they read in the Press —"So-and-So recommends this, that or the other, while someone else says the opposite," and they are utterly confused and at a loss to know what to do. Now, as Mr. Manley knows, everyone cannot afford the time or the means, let alone the interest, to experiment with every suggestion which appears in print, and after several failures, I have known good men to throw up the game in disgust, or else to get so small returns that they wonder if all they read of is not rather stretching the imagination.

We all know that there is bound to be a constant evolution, and this is taking place at the present time in the bee industry. Call it "revolution," if you like, it is practically the same thing, and the rank and file always look to some whom they consider better men than themselves to give a lead and show the right path.

Now, if Mr. Manley wishes to take such a responsible position, let us have some sort of lead which will not have to be reconsidered in about another five years. In other words, *if we have to make a change over from the existing style of hives and fittings let it be a change to something which will not have to be again altered in a few short years.* Such tactics would penalise the majority of beekeepers, that it would amount to almost a calamity, and do far more harm to the progress the industry is making in these islands than could possibly benefit from the use of any temporary improvement.

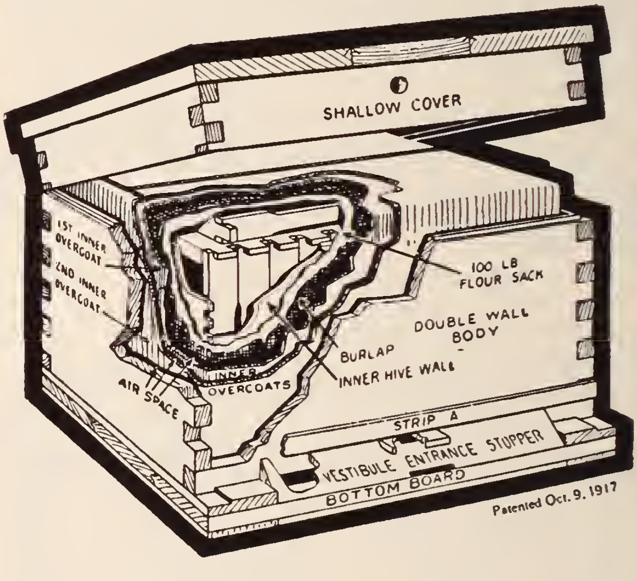


Fig. 38.—Woodman's Protection Hive.

The illustration shows the manner in which the brood chamber is prepared for wintering. During the working season, when the hive is supered, the supers can be furnished with outside rims for additional protection in localities with cool nights or burning sun during the day.

I am sorry that Mr. Manley should think that I was in any way inferring disparagement to his pattern hive, for there are more hives than his on the market to which my remarks would apply, yet their designers have not, so far, signified their objections to my reference to them. As for his statement that the hive I mentioned as being a modification of the W.B.C., or Cowan types, "are not in the least like the Cowan or W.B.C. *either in construction or principle*" (the italics are mine), he abundantly shows his entire ignorance of the trend of American practice in the essential matter of perfect wintering. The same will apply to his remarks on the spacing of frames.

The American hive to which I referred is known as "*The Protection Hive*," made by the A. G. Woodman Co., of Grand Rapids, Michigan, and *is essentially the same in principle* as our ordinary W.B.C. pattern, in that it has a separate or loose brood-box, with loose outer cases, which allow packing material to be inserted in an easy manner. There is no permanent packing, and the walls are ⅞in. thick for the outer cases, not ⅜in., as Mr. Manley states. The spacing of the frames can be had with either the old (American) 1⅜in. or as now being advocated more extensively, with 1½in., and is offered with either regular Langstroth or Jumbo frames. The reports of users of this hive in America are such that I optimistically answered Mr. Prothero's letter, that I considered it a possibility that the bulk of American beemen (*i.e., big* beekeepers), might eventually forsake the single walled hive for a type like this.

Answering Mr. Manley's statement that he thinks that I am inclined to accept theory as fact, will he admit that he has never seen in print or elsewhere any statement of mine which I have not been able to back *by experience*, whether my own or that of another beekeeper of standing? As some small illustration of my meaning, I will quote from the announcement of the A. G. Woodman Co., in the *American Bee Journal* for January this year. They say: ". . Mr. Pellett, the associate editor of the *American Bee Journal*, wrote us suggesting that we place on the market '*protection hives*' with Jumbo frames. He stated that if we could furnish them with 1½in. spacing, in his opinion we would have very nearly an ideal hive, and if he was again to engage in commercial honey production, this would be the hive he would want. Numerous like requests from other beekeepers for this same equipment have been received."

Now, it needs no arguing that in taking the experience of such men as Mr. Pellett, whose connection with the world-famous house of Dadant is well known, the Dadants themselves, and scores of other well known giants in the craft in America, one cannot be accused of "accepting theories as facts," and I think it will also be allowed that it is impossible to go over all the ground covered by their experiences to prove their deductions for oneself, else how can knowledge increase? We should be all going backwards instead of forward, and that is what I want to hammer home to all readers of the BEE WORLD. In order to get the best results, one must keep up with the times, and get the best sort of equipment suitable to his requirements. Hence I repeat my advice: "before making any change, pause and think if it is progress."

I have little to add to my comment upon Mr. Prothero's letter in the last issue of this paper, but I wonder if he is personally acquainted with the vagaries of the English climate. If he is not, he should not lay down any rule for the beekeeper in these shores. Properly conducted experiments, together with long years of experience, have conclusively proved that *ordinary styles of wintering in Britain are always attended with a large amount of chance and risk, whereas, with proper attention to correctly applied packing, together with abundance of sound stores, wintering with no losses* (*apart from disease*) *is as certain as anything can well be in this life.*

As a matter of personal curiosity, I should like to know in what way Mr. Prothero considers the British hive, I mean the W.B.C. of course, as "overelaborate, yet undersized." Compared with the American 8-frame Langstroth, the ordinary 10 frame W.B.C. is not far out, and we have long had larger hives, holding 12 and 14 frames. The British type has the further advantage that it can keep the bees dry, which I have my doubts as to the capabilities of the regular American Langstroth doing. In the latter type, on account of the edges being quite plain and having to be levered apart every time a super is removed, by jamming a hive tool between the joints, they must get chipped and allow the rain to percolate, which in time must cause rot to set in. In the W.B.C. style, the outer cases effectually prevent the wet getting to the inner boxes, which consist of the hive proper (*i.e.*, the brood boxes and supers), so that if the edges are damaged considerably, it does not make anything near the difference it must do to the Langstroth. The suggestion of Mr. Robinson, in the March number, to rebate the edges, is well enough in theory, but the rebates will split off. This has been tried many years ago, and its failure gave another lease of life to that bugbear of British hives, the bottom plinth. The ideal pattern was brought before the public by Messrs. James Lee and Sons, Ltd., over 20 years ago, but the public did not see its utility, and it was left to the perspicacity of Mr. Atkinson, of Fakenham, to bring it to the test of modern thought and practice. This is the type in which the outer lifts are cut cone-shape, having the bottom edges large enough to slip over the top of the lift immediately beneath, and all being made the same size, perfect uniformity is maintained, and the hive can be tiered up to any height, yet having no outer plints to catch the rain, or warp away from the case and allow the wet to creep in the joints. A small stop on the inside edge at the bottom prevents telescoping too far.

This pattern hive, made large enough to accommodate boxes to hold up to 13 frames, of such dimensions as to give all the room a vigorous prolific queen might require such as the Jumbo, 17⅝in. by 11¼in., the deep British Standard, 14in. by 12in., or Abushâdy's 12in. by 20in., or 12in. by 15in., would be as near my ideal equipment as possible. The frames I would prefer to have lugs longer than those made on the Langstroth or Commercial frames. I think 1in. long enough and quite short enough, and for spacing arrangements I give preference to wide side bars, having small studs, such as hob nails, driven in so as to make contact. This is better than the wide shoulder of the Hoffman, which kills bees by dozens every time the hive is manipulated. I would allow the bees no communication around the ends of the frames, and the bee-space should be on the under side, as is now the practice in British hives. The bees could be kept out of the rebate by the use of any simple metal end such as Dr. Abushâdy's design, or the ordinary W.B.C., which latter I always prefer to put on the lug with the flat face inside, thus making a clean shoulder in which the bees cannot chunk propolis. I know some will not agree with my preference for a decent lug, but I honestly think that the short lug is causing more disaffection for the Simmins and Langstroth patterns in this country than their champions will credit. I have had cause to "cuss" the Simmins for this many times, and what I shall do with Jumbo frames full of brood, from which I may want to shake bees in a hurry, holding by two midget lugs of ½in. each, I do not know. Probably I shall grab in the true American style, and chance squashing some brood and honey in the process, but as I intend trying the two sizes of lugs side by side, I hope to be able to make a report on this at some future date.

Referring once more to the question of safe wintering, may I ask subscribers to the American bee press to read up the several articles to which I have referred above, especially one or two in the October number of *Gleanings in Bee Culture*, which may give food for thought to the discriminating beekeeper, being applicable to our climate as well as that of America.

Yours faithfully,
F. M. CLARIDGE.

Copford, Essex

INCREASED HONEY PRODUCTION.

SIR,—In every apiary of any size some colonies will outstrip the others in honey production, no matter how we try to equalise the respective brood nests. No doubt colonies differ in working capacity, but *the heaviest surplus will always be obtained from those hives that happen to have a relatively excess working force at the appropriate time when nectar is most abundant.*

The difficulty is that no definite period can be given for the honey flow, which may come at the right time, say, mid-June, or else so very early in May, or late in August, as to upset all calculations.

It is of course quite impossible that any single colony can be kept on tip-toe all through the season ready to take full advantage of any and every honey flow that may occur from May to August. Hence the popular plan of having *a composite apiary*, comprising strong, medium and weak lots at the opening of each season with the certainty of some being in the pink at whatever may be the right time, and also the sporting chance of the "weaklings" beating all in some late honey flow.

Personally I would rather *start the season with extra-strong colonies*, divide them early, giving fertile queens, and then re-unite just as the honey flow began. These strong colonies are secured by uniting swarms with their parent stocks in Autumn, placing one ten frame brood box above another, with the heaviest stored combs in the upper storey, and the doubly strong force of bees is wintered on all twenty frames. Some may disapprove of *doubling for winter*, but I know perfectly well that the combined forces winter more safely and better than if left in two separate hives

Autumn expansion provides a large cluster of bees and abundant stores to aid the queen in building up rapidly during the following Spring. Such colonies can be divided early in May, directly young queens are available; the two lots kept on the one stand and quickly worked up to ten frames brood apiece. The after-management can be varied to suit the location, and where the honey comes early and is of short duration, the working force of both might be united in one hive at the start.

In this district the season is prolonged and includes heather, so I prefer to super each lot separately and unite the two into one powerful colony just as the heather flow begins.

I give the best filled combs of brood and the supers to one portion, and move the other hive away so that its working force returns to enter the supered colony. When supers are removed, I unite the two lots into one by doubling, and secure a powerful wintering colony as before.

Any beekeeper working on similar lines has the situation well in hand, and by uniting the twin colonies into one can be ready for the honey flow at whatever time it may come.

Yours faithfully,
J. M. ELLIS.

Grenta, Carlisle.

YOUNG QUEENS AND SWARMING.

SIR,—Bearing on my notes on this subject matter in the BEE WORLD for October, 1919, the following observations on five colonies in my apiary may be of interest:—

No. 1. *Italian "Hybrid."*—Year of queen, 1919. Year of queen's mother also 1919. Occupied a full standard brood chamber (10 frames) and 10 shallow frames (worker comb). On June 15th, the stock was preparing to swarm, though it also had a super above. Surplus honey about 15 lbs.

No. 2. *Pure Italian.*—Year of queen, 1918. Year of queen's mother, unknown. Occupied 10 standard and 10 shallow frames, as in No. 1. No idea of swarming. Queen still alive. Surplus honey, about 55 lbs.

No. 3. *Pure Italian.*—Year of queen, 1919. Year of queen's mother, 1917. Occupied similar number of frames as the foregoing. On July 14th I found queen cells which I cut out. This stock was very strong, owing, apparently, to the old bees not having been flying much on account of the long spell of wet weather. On July 24th it swarmed, obviously a hunger swarm. Surplus, about 10 lbs.

No. 4. *Pure Italian.*—Year of queen, 1918. Year of queen's mother, unknown. *Superseded their queen before May* 1st. Occupied 10 standard frames (drawn-out combs) below, the bees refused to occupy these. On June 9th they swarmed. On July 11th they swarmed again (a prime swarm). This also was a hunger swarm. Surplus nil.

No. 5. *Native "Hybrid" (Dark).*—Year of queen, 1919. Year of queen's mother, unknown. Occupied 10 standard frames. On April 29th it swarmed. I purposely cramped this stock, as I wanted it to swarm. Surplus, nil.

You will notice that a two-year-old queen (No. 2) did *not* swarm and its colony gave far more honey than the rest in this year's bad season. At first sight this appears natural; but observe that *all* my surplus honey was gathered from fruit-blossom and was harvested before Nos. 1, 3 and 4 had thought of swarming. Therefore the colony of the old queen has surpassed the others as a honey getter.

Again, notice that two 1919 queens swarmed (I do not count No. 5), and colony with 1920 queen (No. 4) swarmed twice. Of course this his been an abnormal year. It will be interesting to see what happens next year.

Yours faithfully,
H. CAMPBELL.

Cookham Dean, Berks.

THE BEEKEEPING CURRICULUM AT WISCONSIN.

SIR,—I have been reading the BEE WORLD with much interest and watching its progress. You are evidently going to a great deal of effort to publish a first class bee journal, and I have heard a number of our own beekeepers speak of the BEE WORLD with considerable enthusiasm. Personally, I think it is one of the best bee journals being issued to-day.

We are paying a great deal of attention to beekeeping here at the *University of Wisconsin*, and our curriculum provides for a four year course in beekeeping as well as several short courses. We have at the present time an elementary class of 48 students.

Yours faithfully,
H. F. WILSON.

Madison, Wis., U.S.A.

[Readers of the BEE WORLD not acquainted with Prof. Wilson's writings, and especially of his keen interest in the organisation and development of the beekeeping industry, are recommended to study his article, "Organisation Work," published in *Gleanings* for May, 1920.—ED.]

HONEY IN ARGYLL.

SIR,—Like most Highland districts in Scotland, Argyllshire suffers from the disadvantages of its isolation. Its population is sparse; its means of transit poor. It has, however, the characteristics native to the Highlands—the roaring mountain torrent, the rugged grandeur of its hills, the home of the hardy mountaineer.

But what fascinates the beekeeper, with his keen perception of the possibilities of his craft, is the Autumn heather bloom, stretching for acres and acres over moor and hill.

He thinks of honey, and the heather honey of this district is second to none. In comparison with other honey it has a place of its own. We should not claim it as the finest, but it stands unique, and justly so. Its colour is a beautiful amber tint, and its consistency is surprising. Cut the comb and it clings to the cells with a tenacity that makes one wonder. The taste is something more than usual. The connoisseur smacks his lips and "dwells" on it. He praises it and tastes it again and again.

It has a "snap," a something which is peculiar to itself.

It is gaining a world-wide reputation. Many are developing a liking for it, and are very much "after" it.

We do not suggest that the county is a land overflowing with honey, for the reason that climatic conditions are not so favourable as in the south, but still, we are generally fortunate with a spell of good weather that enables a fair crop to be gathered.

There is room for another Highland industry, and the fact that there is one beekeeper for every 12 square miles will show that much could be done to foster the production of honey in this part. School and village bee-clubs could be formed. All those on the land could add to their larder, and as a side line it would aid materially to the comfort of many.

There is reason to believe that future development is in store.

The *Scottish B.K.A.* has again invaded "Dalriada," and branch associations are springing up throughout the county. Enthusiasm is in the van, and it may be that this delectable sweet, "Argyll Heather Honey," will be better known, and find a proper place in the markets of the world.

Your Herculean efforts on behalf of beekeeping are truly wonderful, but I do hope that you hold in your hands the lever that will uplift the Bee World.

Yours faithfully,
D. MacDONALD, E.B.: S.B.A.

Millhouse, Argyll.

THE WEIGHT OF THE BEE IN RELATION TO FLIGHT.

SIR,—Permit me to call attention to what appears to be a slight error in Miss Betts' reply to "Delta S." in your issue of June-September. It is high time that attention be called to the absurd view that a bee becomes lighter in weight by inflating her tracheal sacs, and in this Miss Betts has done a service. Such a view was, of course, but the usual guesswork of our pseudo-scientists.

The case is, however, better than Miss Betts makes out. She assumes that the body temperature of the bee is 34deg. C., whereas the temperature of the bee's body is always the same as, or only slightly higher than, that of the surrounding air. Another one of the analogies so detrimental to scientific progress is that the bee has a "body temperature." Bees are, of course, cold blooded (poikilothermous) animals and what heat they generate is by muscular activity and through the chemical processes of secretion and other bodily functions. They do not maintain a uniform body temperature, but this may vary from 57deg. F. (14deg. C.) to perhaps 120deg. F. (49deg. C.) or more, depending on the temperature of the surrounding air. If by chance they are exposed to temperatures below the stated normal minimum they first lose the power of flight and at lower temperatures the power of other movements. It must be remembered that an animal with so little body mass and relatively so large a surface can maintain a temperature very slightly above that of the surrounding air and, while in flight, considerable heat is generated by the action of the thoracic muscles, this is rapidly dissipated. It is interesting to note that when bees fly at temperatures below about 57deg. F. they can keep up flight for some time, but if by chance they alight, they are almost instantly cooled, and at temperatures of about 50deg. F. they often are unable again to take wing.

Coming back to the problem before us, since the difference in temperature between the bee's body and that of the surrounding air is less than Miss Betts states, the resulting decrease in weight due to inflation is virtually measurable only in a series of ciphers. I am glad that Miss Betts thought it worth while to call attention to what all thoughtful persons must long have known. Now if someone will determine whether bees are actually any more inflated in flight than when rapidly respiring at other time, we may gain still further knowledge, but this is really a point of no special importance.

Permit me to commend Miss Betts' efforts to bring about greater accuracy in our current beliefs regarding bees. We have in the past been cursed with too many analogies between ourselves and our bees, and the only source of information is to ask the bees by means of scientific investigations.

Yours faithfully,
E. F. PHILLIPS.

Washington, U.S.

DIFFERENTIATING RACES OF BEES.

SIR,—Mr. Stich's quotation in the Spring Number of the BEE WORLD, 1920, from "*L'Ape e la sua Coltivazione*," and the comment thereon from Capt. H. Campbell in the following issue, are rather interesting, if of no immediate practical importance to British beekeepers. If you have a little space to spare, I should like to add a little to their joint remarks on the races indigenous to India. I have not the advantage of first-hand experience as Capt. Campbell has had, but will quote from a very interesting handbook published by the Department of Agriculture in India, and compiled by C. C. Ghosh, B.A., under the direction of Dr. T. Bainbridge Fletcher, the Imperial Entomologist, at the Research Institute, Pusa.

This booklet is compiled for use in India, and deals with the ordinary methods which are in common use throughout Europe, showing how they can be applied to Indian practice with advantage.

On pages 24-26 there is a very interesting description of the native varieties, which do not, however, tally with the quotation of Mr. Stich, although it mentions that *Apis Indica* most nearly approaches our European races, both in size and habits. Mr. Ghosh gives four kinds of bees found in India, which corresponds with the statement of Mr. Drierberg, of Ceylon, in the June issue, 1920, page 38.

As *A. Indica* appears to be the only variety suitable for human cultivation, I will deal with it first. An excellent set of coloured illustrations of the different varieties in Mr. Ghosh's book show us that the queen is darker than the worker, which latter has a very handsome appearance with its striped rings round its abdomen, the colour even extending to the meta-thorax, as in some of the Mediterranean races. The size is slightly less than our native or the Italian races. He says, "According to the locality, this bee shows a little variation. Thus the variety found in the hills is slightly bigger and much darker than that found in the plains. It is not as good a honey-gatherer as the Rock Bee (*Apis Dorsata*) or the European bee. The maximum quantity of honey obtained from a single colony of this bee in the plains is about seven pounds when the colony is very big, or a little more in the hills. An average quantity is about six pounds annually. The plains variety is more irritable and more prone to stinging than the hills variety. These bees are very prone to swarming and are found to migrate as well to some extent. The hill varieties, however, show a less propensity to do either. They cannot defend themselves against enemies so well as the Italian bees, and the Wax Moth plays havoc among them." He also says that they are smaller than the European bee and that they always live in closed places such as the cavities in tree trunks, under the ground, in rocks, or sometimes in walls, also sometimes in unused boxes, and in recesses in walls and windows which are kept shut. They always build combs side by side, and parallel to each other (as our own bees do).

I will leave the Giant East Indian bee until last, as I have very recently had some very interesting information upon this variety, and will take next *Apis Florea*, the smallest known variety, which follows out the habits of other honey bees in building and storing and in breeding under its stores. I am afraid that Dr. Asprea has got a little confused in his differentiating, perhaps on account of the divergence of sizes in *A. Indica*, according to locality, as previously quoted. His statement that it is "cultivated with success by the natives of India" is open to grave doubt, when Mr. Ghosh states that the comb of a colony is about the size of the outstretched palm of the hand, and the amount of honey stored is *only a few ounces.* That the natives do collect the combs of the wild colonies and obtain what little honey there is in them, may well be, for this is a regular trade in many parts, especially in the forest districts, where the Giant, or Rock Bees, are regularly hunted by natives, who lease the rights to collect the combs from the Forest Department of India. They carry out the operation by simply smoking out the bees, and squashing the combs up to drain the "honey," which contains a weird mixture of the juices from the larvae, and any unripe honey there may be, which, needless to say, soon ferments and acquires a repellent flavour.

The fourth species, the Dammer Bee (*Melipona*) is also not amenable to cultivation, so we will leave that, with the passing remark that there is a similar variety in South Africa, which builds under the ground. An interesting description of this South African species was described in an article which I believe appeared in the *B.B.J.* some time since, but I cannot find it up to quote from it. This species stores its honey in sacs apart from the brood-nest, which is connected to them by tunnels, thus showing a distinct divergence from the type of bee which we usually call "Honey-bee."

The remaining variety is popularly known as The Giant East Indian Honey Bee (*Apis Dorsata*), sometimes called the "Rock Bee," from its inclination to take advantage of an overhanging rock from which to hang its immense comb, which will sometimes spread to a width of five feet and a depth of six feet, and are credited with having had the enormous amount of 60 lbs. of honey taken from a single comb! They are commonly reputed with being very ferocious, reports of humans, and even elephants, being stung to death being recorded. Whether these reports are accurate or not, I am not going to discuss, but from the size of the workers, I can credit their putting a very wholesome fear into the very superstitious and gullible natives. There is also the possibility of such tales being something on a par with some of our own hoary old fables, such as "Telling the bees" which never lose anything in the passage of time. Suffice to say that the veteran expert, Frank Benton, whose death was recorded only some 20 months ago, proved that they are quite amenable to proper handling, and he actually got some installed in frame hives, notwithstanding their natural habit to build a single comb.

The latest information that I have about these remarkable bees is that we have in England an ardent researchist in the person of Dr. W. MacGregor Reid, who is an expert entomologist, one who has got some of these bees alive, and has been experimenting with them in an endeavour to obtain a crossbreed from Dorsata drones mated with Italo-Cyprian queens. Unfortunately, so far, he has not attained any measure of success, owing to the queen being unable to shake off the drone after copulation. In one case, the queen was fertilised safely, and laid well, but the brood came out like drone, and appeared to die on the 15th or 16th day. Perhaps this may have been due to the cells being too small for the larger larvae of the crossed race. The remainder of his Dorsatas are being sent to France for the winter, where a friend of his is uniting them to a stock which he has managed to maintain for two years, so that we may hope to hear soon that he has been successful in acclimatising them, and in that case we may hope to hear something further about these wonderful bees in Britain. I believe I am right in saying that this is the first time that anyone has been successful in bringing this variety to England, and all credit should be given to Dr. Reid for his painstaking yet unobtrusive efforts, as in this way we shall be able to learn more from first-hand experiment, which is far better than any amount of hearsay.

This same gentleman, I am informed, had at one time some 500 stocks of bees of all varieties. His then gardener, also an ardent beeman, had management of these stocks, and the hives were at first of American type. Plinths had to be fitted to them, and the choice of hive was finally fixed on Lee's "Snelgrove" hive, a W.B.C. style having 11 frame brood boxes, which were specially made to hold 16in. by 10in. frames. The Jumbo frame was eventually found to give better results, and all the brood boxes were altered to accommodate Jumbo frames. This gardener bee-expert, who has lost his right arm in the war, had American experience, and was in touch with American makers, so he imports his own fittings and swears by the Jumbo frames in a W.B.C. pattern hive, holding 12 frames in the brood chamber. Perhaps when Mr. Prothero comes home, he will undertake the conversion of this naughty man who swears. Forgive the digression from the Indian races of bees. You will see how one thing has led to another, and these topics are interesting to many readers of the BEE WORLD, I know, so trust they will overlook my lapse this time.

Yours faithfully,
Copford. F. M. CLARIDGE.

THE REVOLUTION OF THE HIVE.

SIR,—As one whose name has been before the beekeeping fraternity amongst those scientifically interested in the development of the metal foundation and the metal comb in this country, and has had every opportunity of gauging the exceptional engineering difficulties encountered and the almost insuperable obstacles surmounted under heartbreaking industrial conditions, allow me to express my admiration of the courage and perseverance shown and the great service rendered to the cause of scientific beekeeping.

Of course there will always be "big"(?) people who cannot see when a step forward has been made, and I suppose there will likewise be others who consider it their duty to obstruct and misrepresent any innovation, as I have noticed lately in a contemporary, but one can easily afford to ignore these cries of "sour grapes."

What really matters is that new interest is being created, as I have good reason to know, and perseverance is bringing its reward. Whilst many are waiting interestedly and others are merely sitting on the fence instead of giving their solid cooperation to the venture, the progress which is now being made by the tenacity and energy of a few is all the more creditable.

Yours faithfully,
T. I. ROBINSON.

Crayford, Kent.

A NOTE OF INTERROGATION RE LEGISLATION

SIR,—Canada was the first country in the world to adopt legislation for the eradication of bee diseases. This was some 30 years ago. I use the word *eradication* advisedly, as it was the complete wiping out of "Foul Brood" that was to be accomplished. In the *British Bee Journal*, March 31st, it is said, "British beekeepers acquainted with Canadian beekeeping conditions and news must be aware of the great service which legislation for bee diseases has rendered to the Dominion. . ."

It is just this "great service" that I am querying. After 30 years of strenuous effort in Canada to suppress disease a friend has supplied me with some statistics. It seems that in the province of Ontario 40 per cent. of the apiaries there have Foul Brood and 30 per cent. of the hives in that province are diseased! I do not know whether there were statistics furnished of Ontario when they were asking for legislation thirty years ago, but I make bold to say the proportion of disease *then* was far less than now.

A few months back in *Gleanings* a late Inspector in Ontario wondered if his efforts while Inspector had been productive of good. A close study of the disease situation over the Continent of America leads me to the opinion that F. B. is increasing in spite of all legislative enactments—I had almost said *because* of these "big stick" enactments.

It would be interesting to get figures—even approximate—as to F. B. in Britain. I would be surprised to hear that it amounted to more than 5 per cent. of total stocks. *Certainly* it does not amount to anything like Canada's 30 per cent. under Government control. In the U.S.A. the cry is now for the *teacher;* they are finding out that they have had more than enough of the policeman. Let us take heed!

Might I, in conclusion, appeal to all shades of opinion on this rather thorny question to tackle the subject in a spirit of "sweet reasonableness"? It is, after all, if we want to avoid heartbreak and disaster, a question of fact facing and stern logic. Let us also be assured of the honesty of the other fellow in his opinion, just as we ask the other fellow to credit us with following our lights honestly.

Yours faithfully,
R. WHYTE.

Cumbernauld.

[The *B.B.J.* article which Mr. Whyte criticises was as follows. We shall be publishing in a future number some notes on Canadian Beekeeping and the effect of Legislation in the Dominion.—Ed.]

Legislation for Bee Diseases.

British beekeepers acquainted with Canadian beekeeping conditions and news must be aware of the great service which legislation for bee diseases has rendered to the Dominion and also to any beekeeping community elsewhere which has adopted *and applied* legislation, relying chiefly on the weapon of *education* in fighting bee diseases.

To take but one illustration, let us consider the case of British Columbia, where legislation has not only managed to discover many nests of disease, but where laxity in applying legislation, or insufficient regard to instructing the average beekeeper have contributed to maintain or to create epidemics, for we gather that at the present moment beekeepers in parts of British Columbia are having a serious time with European foul brood. Yet the Canadian beekeeping industry on the whole, since the introduction of legislation, has made great progress. Here is much food for thought. This also explains why we are anxious in this country not to have legislation in name only, or in the shape of the "big stick." Such a course would produce no good to the industry. In effect it would be a farce and a blunder.

There are indications to show that the Government are beginning to recover from the shock of recent bye-elections, and it is quite possible that the Bee Diseases Bill will see its way to Parliament ere long. It is up to us to demonstrate to the Government that beekeeping in Great Britain should not any longer be considered as negligible, and to accelerate the journey of the Bill.

Having pledged themselves to set up a *Bee Advisory Committee*, representative of the craft, to advise regarding legislation and beekeeping matters generally, the Government ought to fulfil that pledge forthwith. We have had enough in the past both of over-delay and undue haste, and we must protest against any return to one practice or the other. Let us have one or more meetings of the *Bee Advisory Committee* to further consider the provisions of the Bill, and the case for the Government in maintaining its draft. This is the only sane course for obtaining not only the assured majority, but practically unanimity for a good measure of legislation, and to the manner of its application. What trouble or costs will the Government be put to in convening this committee? Practically nothing. But just because a panic rule has been made for shelving the Bee Diseases Bill with many others in the "economy" campaign stunt, therefore we must pay the penalty for the Government's non-recognition of the present status, and future possibilities of British beekeeping, although the Ministry of Agriculture continue to assure the craft that they have their interests at heart. In urging on the Government to drop their dallying practice, organised beekeepers will not only be fighting for the early introduction of legislation, when soon another season will be with us, but will also be demanding a higher recognition for themselves, since the recent treatment from the Government amounts to considering beekeepers as no more than a nonenity. Much as we appreciate the excellent work of the Ministry of Agriculture, we must admit that many beekeepers feel that the Ministry should have urged the Government to give greater consideration to the best interests of British beekeeping. We need not, however, dwell on this point. The call of the hour is that the Ministry of Agriculture should make amends. The present inertia is doing no good either to the Government or to the craft.

The correspondence reaching us from all parts of the country makes it clear that beekeepers are determined to put an end to the present state of mockery, which has well suited the commercial adventurers for trying to sow discord amongst the craft, though without any lasting effect. As an illustration they have the audacity to suggest that because of their incoherent noises the Government have *withdrawn* (not merely postponed) the Bee Diseases Bill, and that so long as they are capable of barking, which we presume is a lasting qualification, no legislation will ever be introduced in this country! No thinking beekeeper will be able to digest this sort of propaganda, but it cannot fail, when supplemented by the apathy of the Government, to reflect on the prestige of the latter in the eyes of beekeepers.

Lt us examine once more the *arguments* advanced by the opponents of legislation.

They say that they are alone the "practical" beekeepers whose lead should be followed! The thousands of beekeepers, great and small, who produce the bulk of our honey and constitute the overwhelming mass of the craft in *number*, *capital* and *labour* do not count! These are presumably "non-practical" because they are not of the boastful, pretending type. Assuming even that the opposition are all constituted of "practical" men, what confidence are they entitled to when the majority of them rely on insinuations and misrepresentations for advancing their views; when on their own showing we should sacrifice the interests of the craft as a whole to theirs, just because they are "commercial" men (a claim in *one* special sense which we do not dispute); and when their pretences disclose, on dissection, that their empty dirty boxes and skeps count as stocks, which apparently swarm in winter, to judge by the fresh claims since the discussion on Legislation!

They indulge in all manner of *theoretical* arguments about *Acarine disease* and *Nosema disease*, yet they carefully avoid the established *facts* and anxiously refrain from all reference to *brood diseases*, which are alone still responsible for *many* losses annually.

They say that they are opposed to registration because the small fee chargeable would discourage new beekeepers! Yet having found that the Ministry of Agriculture do not propose to introduce registration at the beginning (a delay which we personally do *not* approve of), they are now, *with characteristic inconsistency*, insinuating that the object of dropping registration is to find work and an excuse for appointing a large number of inspectors!

They say that the introduction of Legislation is premature, because no satisfactory remedial measures for adult bee diseases exist (the serious brood diseases are again forgotten), as if the prevention of the spread of infectious diseases must necessarily be associiated with successful remedial measures; or, as if in case such remedial measures can never be found, we must continue for ever to tolerate the trade in diseased bees!

They say that we have not a sufficient number of good beekeepers as officials to administer the provisions of the coming Act. Over twenty years ago they used to advance the same argument! One wonders *when* will British beekeepers be considered capable of making a *start* with Legislation, in spite of initial faults, or even blunders?

They say that the best alternative to Legislation would be for County Associations to buy for destruction diseased colonies and infected appliances. We can well understand the enthusiasm for such a suggestion, when we find it emanating from the very people whose carelessness has been an unworthy example for the wholesale spread of disease, and who never attempted to practice what they suggest to others! Of what use, we ask, would be such a cleansing course if infection is permitted through the non-restricted sale of bees? Are County Associations in the strong financial position that would justify such a proposal? Is it not ridiculous to suggest that the Government cannot spare the comparatively little money needed for educational and administrative work in connection with Legislation, but that the impoverished industry (which the opposition themselves are anxious to assert cannot conveniently provide the registration fees) is capable of relieving the Government from their obligations?

Most of them say that they are *not* opposed to the principle of Legislation, but that they are opposed to a "skeleton" Bill. Well, the Ministry of Agriculture have strong administrative, legal and even educational reasons for an elastic Bill based on the "Order" system, so well known and fully successful in public health measures. They are further convening a large representative *Bee Advisory Committee*, as previously mentioned, to advise on the provisions of the Bill, and finally on the administration of Legislation. The *Bee Advisory Committee* will consist of sixteen members, and the Government's nominees are no more than two. Further, the Ministry of Agriculture are perfectly willing to follow the desire of the Craft as a whole, and *not the orders of a single section*. Could we have hoped for any wiser policy?

They repeat their familiar insinuation that the object of Legislation is to create jobs for inspectors, and that they know some of the likely candidates or aspirants. Perhaps they do know them—amongst themselves. . . So far as we are concerned, we do not know them, although we quite appreciate that aspirants to Government appointments will *always* exist. But we shall certainly never invite or support unmerited or unnecessary appointments. The application of Legislation must begin carefully, gradually, and methodically. Undue haste and enthusiasm or panic will do more harm than good.

They say that many former supporters of Legislation have joined the Opposition. With the exception of a *few* opportunists and adventurers, we emphatically assert that the cause and supporters of Legislation are stronger than ever. Credit is due to the Ministry of Agriculture for achieving this by their broad-minded policy; and if they will now stir up the Government to act, they will win the gratitude of the bee craft in the whole country.

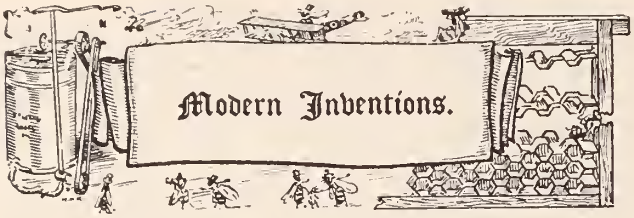
DO BEES ATTACK TITS?

SIR,—When transferring a stock of bees to a clean hive on a hot day during April, I was surprised to find underneath the alighting board of the old hive a dead tit. I know that these birds devour large numbers of bees, but how can we account for the dead bird being in this position? Was it mobbed by bees?

Yours faithfully,

G. MONTAGUE HARE.

Rayleigh, Essex.


Modern Inventions.

Necessity is the Mother of Invention.—Pr.

Adminson's Aluminium Semicomb.

This is a new type of artificial comb which is the second of a series ranging from a composite metal foundation to a fully drawn-out metal comb.

The object of the invention is the development of a good artificial comb foundation that will compromise as well as possible the claims of both schools of beekeepers—the conservative and the revolutionary.

Historical.—The use of metal as a midrib or septum for wax foundation or as a skeleton comb coated with wax is no new idea. Probably the core process of Jung and Cämmer introduced in 1893 is the most ingenious ever evolved so far as the production of the former is concerned. It failed not so much through the cost of manufacture as through the faulty inconsistent product which it created. Other attempts to produce a composite foundation, consisting of a metal midrib with wax foundation proper superimposed or with wax coating, equally failed for good physical reasons. Not long ago the use of electrolyis was employed in America for getting well shaped metal foundation, to be coated afterwards with wax, but apparently with no better success. The work conducted in this country is sufficiently known not to need further discussion.

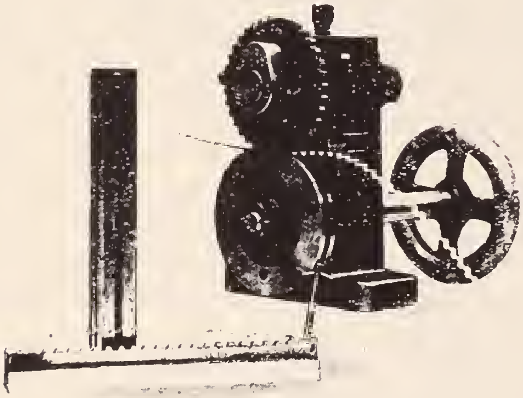


Fig. 39.—The first experimental crimping machine designed by T. R. Robinson, Esq., and modified by W. L. Baylay, Esq., for the production of the **Semicomb**. The illustration also shows Mr. Baylay's rectifying die and perforator.

Regarding the metal comb, probably the best known initiative is that of the celebrated Moses Quinby, who utilised ribbon metal for making a small skeleton comb which he waxed and inserted in the centre of an ordinary wax one, with gratifying results. His interesting experiments are recorded in his noted work, "*The Mysteries of Beekeeping Explained*," the first edition of which appeared in 1853.

In 1917 the MacDonald comb appeared in America after previous years spent in experiments. Since its introduction it has undergone few alterations, the most notable of which is the reduction in wax coating, and we feel confident that with all its faults—previously dissected in the BEE WORLD—it will continue in beekeeping history to be looked upon as an epoch-making invention.

Almost immediately after its appearance in the U.S.A. interest in the invention was stimulated in this country. To the *Apis Club* the credit belongs of introducing and popularising the metal comb, its derivatives and modifications in

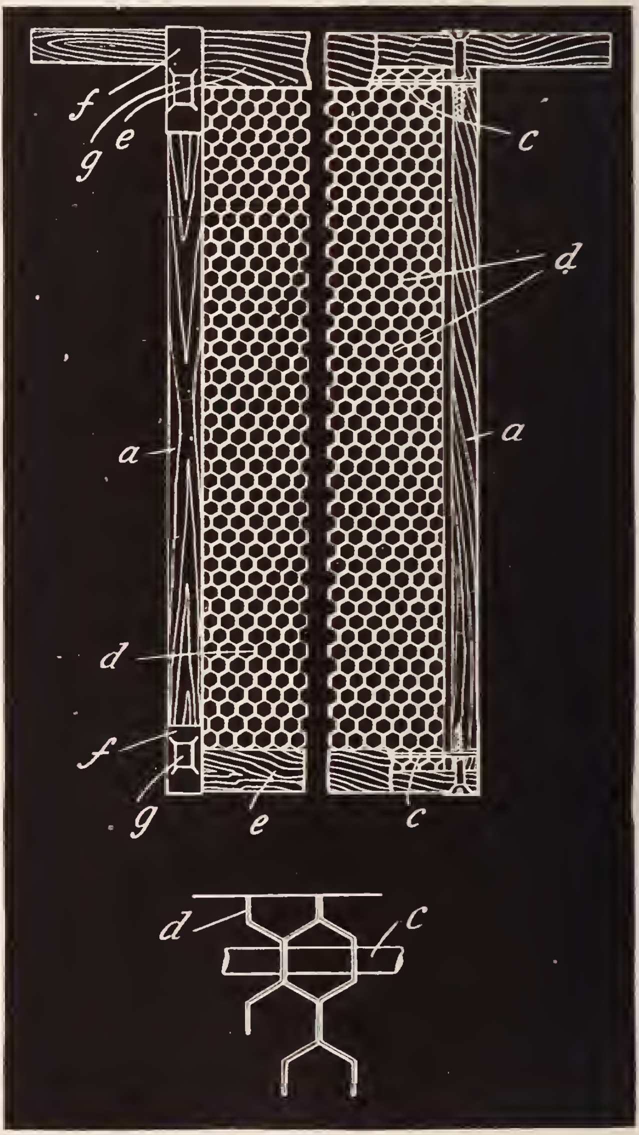


Fig. 40.—The Illustration shows one side of a framed **Semicomb**, and illustrates the manner in which it is gripped by the frame, and is correctly spaced both top and bottom from adjacent combs. *a* are the side bars: *c* are the suspension wires upon which the cell elements *d* are threaded: *e* are the top and bottom bars which are channelled for receiving and gripping the **Semicomb** structure: *f* are the "Y or U-shape" clamping spacers with adjusting projections, *g*.

the United Kingdom, and of conducting a good deal of experimental and educational work in the face of much prejudice.

Factors in Success and Failure.—Whereas much attention has been paid in the past to the engineering aspect of one invention or the other, little has been paid to the *special demands* for such revolutionary appliances in conformity to the economy of the hive. For instance, we entirely fail to discover that MacDonald ever advised a new system of beekeeping to suit his invention, whereas there is no doubt that a metal comb demands quite a different treatment from that accorded to a wax comb. *The principle of insulation must be faithfully applied* as compatible with practical beekeeping. The little extra trouble taken is really negligible. In the absence of such precautions, little wonder that in hot parts of the U.S.A. the single-walled hive does not ward off excessive heat, which results sometimes in the drying off of the larvae's food and the consequent loss of brood. For analogous reasons in very cold districts, early brood rearing in the Spring is discouraged in the absence of such precautions.

In an artificial comb which cannot be easily repaired, *strength is essential.* The weakness of the MacDonald Comb is a defect which may deserve legitimate complaint.

Another defect which contributes sometimes to annoyance in a pollen-clogged artificial comb is the absence of facilities for detachability. Such a defect undoubtedly prejudices the commercial chances of the article. But we do not agree that difficulties in its successful sterilisation by boiling count, since there are several other methods of sterilisation which easily lend themselves to our convenience, such as sterilisation by formalin or sulphur fumes. There is *no* factor of failure, therefore in this connection.

It has been suggested that old metal combs with cocoons will in time become chocked up and useless. We cannot understand the weight of this argument, seeing that bees can and *do* scrape the inner layers of cocoons even in old wax combs, when they *need* to do so.

It has also been suggested that metal combs are not safe from rats and mice. We have been compelled to store hives and accessories in a barn which is not rat free and we have *never* had a single specimen of metal comb injured.

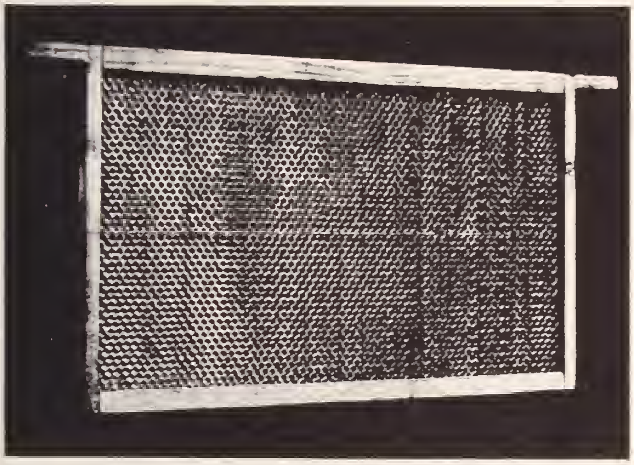


Fig. 41.—**Adminson's Aluminium Semicomb** as produced in 1920.

We conclude, therefore, that most of the objections raised are *not genuine*, and will not count as factors in failure. An important factor in success, however, is economical production, and this appears at last to have been achieved in America, although in the absence of severe competition, a stronger and better article no doubt could be produced on the other side of the Atlantic, at a little higher cost.

The Demand of Scientific Beekeeping. — Given capital, manufacturing and marketing facilities, *any* good article could establish its commercial value and would in due course even compel recognition and appreciation—through education—from a previously hostile public. In the absence of one or more of these facilities, failure does *not* by any means indicate a lack in real value.

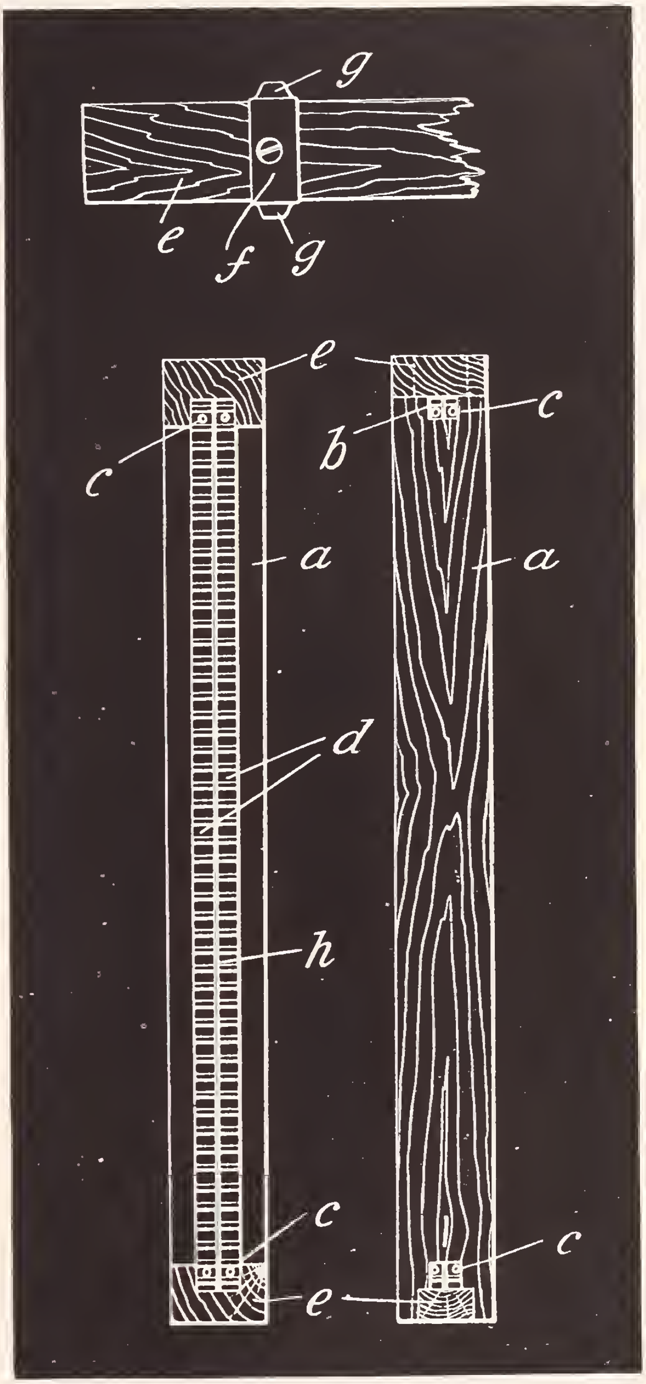


Fig. 42.—The illustration demonstrates the position of the clamping spacer. *f*, on the top bar of the frame. *e*. Correct spacing is secured by the adjusting projections. *g*. It also demonstrates an end view of a frame showing slots. *b*. for the suspension wires. *c*. spacers removed: also the central internal aspect of a frame side bar and the relation of its surface to the component parts of the comb; *h*. being the mid-rib or foundation proper. Compare this figure with previous ones.

The demand of Scientific Beekeeping for an artificial comb or comb foundation is undoubtedly one for a reasonably durable successful article, which has distinct hygienic features, which is reparable, and which is economical. Suitable paper, celluloid, and various colloidal substances which commanded our attention in the past had in turn to be turned down one after the other, owing to defects which far outweigh their advantages. Light non-poisonous metal such as aluminium has unique features of its own which answer at least most of the qualifications of the material constituting a good artificial comb. It would be foolish to prefer saving a little trouble in management on insulating lines and have an artificial comb les conductive to heat and cold which in other respects is much inferior to a metal one.

Whether the present invention receiving the title of this article will fill the bill or not, time will show. The accompanying illustrations wil demonstrate the broad outine of specifications, also the type of *Semicomb* produced as a beginning. The principles underlying the invention could equally be applied to the manufacture of a developed type of metal foundation or to the production of a complete metal comb, but the *Semicomb* appears to be of greater service than either of the former. Its design is very simple, as the illustrations will show. Although in its construction an embossed foundation instead of a midrib would be preferable, so as to suit one's convenience in using the whole *Semicomb* as constituted or to dispose of the "webs" and use the foundation only, the present industrial conditions compel the use of a plain septum in the manufacture of the *Semicomb*. A thin coat of a propolis mixture is used for joining the "webs" to the midrib, for the sake of saving unnecessary labour to the bees. This mixture, howexer, is easily dissolved and got rid of, when not required.

W. L. BAYLAY, ESQ.,

To whose keen sympathy, genial co-operation, and engineering ability, the final perfection **Adminson's Aluminium Semicomb** is due.

It would not be unreasonable to claim for the invention the following four fundamental features:—

(1) *Advanced Hygienic Qualities.*—Each part of it, being detachable, it could be taken to pieces, if at all necessary, sterilised or cleansed, then re-adjusted. The procedure is of course troublesome; but there is almost nothing in beekeeping which is pure honey.

(2) *Reasonable Durability.*—Being made of ribbon metal corresponding in thickness to the walls of an old wax comb, its durability should be greater than a thin walled metal comb which is easily damaged. Further, the manner in which the *Semicomb* is gripped in the frame provides good means for its protection.

(3) *Adaptability to Repair.*—The component parts of the *Semicomb* are all standardised and could be supplied separately. Any damaged part could be removed without any great difficulty and a new one substituted.

(4) *Economical Qualities.*—Not only in the cost of production and maintenance in good form, but also in its working features, in as much as: (*a*) The bases of the cells have no holes to be filled with wax by the worker bees prior to the queen bee laying in them, as in the case of the MacDonald Comb. There is no waste of time for the development of the colony on this account. (*b*) Most of the wires holding the component members of the *Semicomb* are outside the breeding and storing areas; and therefore the utility of no great number of cells is sacrificed, whether temporarily or permanently. (*c*) The use of 5 cells to the linear inch—a choice resulting from many observations on natural combs and on hatching results—appreciably increases the cell area and augments the value of the appliance. (*d*) The bees are permitted to prolong the metal cells with additional wax walls, thus saving unnecessary metal and at the same time affording a good compromise between a wax comb and a full metal comb. and yet the queen is not hindered from egg laying from the very beginning. The *Semicomb*, therefore, is in a sense another form of developed and economical metal comb foundation, which compromises the views of different schools of beekeepers and provides an alternative where industrial conditions do not favour the production of embossed or stamped metal comb foundation. (*e*) The easy packing of the *Semicomb* in the flat, should the purchasing beekeeper require to assemble it himself during the non-working season, thus reducing the cost of purchase.

We have the greatest pleasure in acknowledging a debt of gratitude to the steadfast loyalty, unabating interest and valuable help of Mr. T. I. Robinson, of Vickers, and Mr. W. L. Baylay, of the B.S.A. fame, to the collaboration of both gentlemen the *Semicomb* owes its engineering success.

THE LIGHTNING SCARIFIER.

The "Lightning Scarifier" is a little compact contrivance invented by Mr. James N. Langlands, C.E., E.C.: S.B.A.; of Dundee (now President of the *Scottish B.K.A.*) and used in his apiary with gratifying results. It is being introduced to the Craft by Messrs. Steele and Brodie, of Wormit, Fife.

The object of this appliance, the illustration of which is self explanatory, is to evolve a convenient method of uncapping, especially of irregular combs. When the comb surfaces are irregular and uneven, there is sure to be some trouble with the cappings; but combs after being put through the Scarifier several times and properly spaced in the supers will be reduced to an even surface all over and the benefits of this form of uncapping be fully attained. There is a zinc plate supplied with the Scarifier which can be slipped on over part of the instrument. This forms a guide for the bottom bar when working with shallow combs. When using it with broad 1¼in. shallow frames, the end blocks can be turned round so that a wider notch in these blocks allows for the broader top and bottom bars slipping down. The spacing of the steel pickers can be also adjusted to allow for combs drawn out with the 1⅜in. or 1 5/16 in. metal ends.

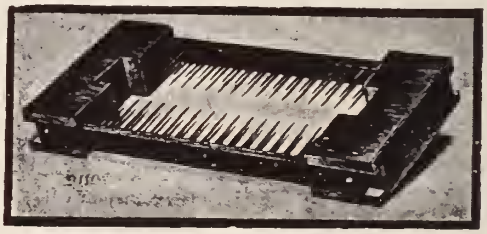


Fig. 43.—The Lightning Scarifier.

The Scarifier appreciably eliminates the sticky operation of the hand knife methods, together with the use of uncapping trays and knife heaters. The cappings passing through the extractor are retained in the muslin or perforated zinc rstainer over the ripener.

When in use, the Scarifier is simply laid on top of cage, and the top and bottom bars of frame entered in the guide notches and pushed down into cage. The operation is simple and effective. The invention, however, is in its initial stage of application. It is sure in time to command improvements, and certainly seems to have a good future before it.

* * *

History is philosophy teaching by examples.—Bolingbroke.

APIARIAN SOCIETIES.†

It has often been suggested to me to point out *how* the culture of Honey-Bees might be more generally extended in this country, and rendered more advantageous to the cottager than it has been hitherto. As regards the extension of Bee-Cultivation, I would observe, that if those gentlemen, especially those gentlemen resident in the country, who possess affluence, influence and leisure, would undertake to promote it—would set the example and keep bees, their example alone would go far to induce the cottager to keep them; and that, as other countries boast, and that so usefully, their apiarian societies, the formation of such a society or societies, could not fail to be attended with beneficial effects. Some feeble attempts, it is true, to establish such societies has been made, but have proved abortive; whilst premiums on the subject have been offered by other societies* injudiciously, as they have tended to perpetuate mistaken views, and to retard the progress of more correct ones. I am not insensible of the extreme benefit which has resulted to the different branches of industry, and to agriculture and horticulture in particular, by well-regulated scales of premiums, emulating to superiority and necessarily promoting a beneficial stimulus in the different branches with which they are connected. And, in my opinion, nothing would more easily tend to the inculcation of sounder views of practice than if gentlemen, pursuing my principles, would interest themselves in connecting with the objects of such associations more generally, graduated scales of prizes, regulated by the quantity of honey obtained from stocks, the prosperity of the hives afterwards, and the state of the apiary generally, etc. Were they also to countenance the plan of placing colonies under the care of labouring cattagers, giving them premiums as an inducement to careful management, they could not fail of conferring a benefit, by initiating them into the plans of the system, as well as by more advantageously dividing the pasture of the district among the different hives, and thereby rendering the labour of their collecting the stores considerably less to the Bees. This would, undoubtedly, effect much, but I know of no means so decidedly calculated to foster and encourage the culture of Honey-Bees among all classes, and more particularly among the population of rural districts as *apiarian societies, formed for the express purpose of extending and improving the cultivation and management of Honey-Bees*: and I would fain hope that the time is not far distant when such societies will be formed, in rural districts especially, and be fostered and encouraged in proportion to their utility, and the important object they should ever have in view—*the humane management of Honey-Bees.*

* * *

'Tis better that a man's own works than that another man's words should praise him.—Sir R. L'Estrange.

BURGESS'S GLASS QUILT.

"Opinions differ on the question of protecting bees in winter," says Mr. Cowan, ". . . . Some beekeepers use the so-called glass quilt. . . . It has a hole in the centre, with a wire cap for feeding, allows free passage above the top bars, and should have warm material put above it to prevent condensation of moisture on the glass."

It is not unusual to see recommendations for one appliance or the other without any reference to factors of success or failure in its use. The last remark in the above statement by Mr. Cowan deserves, therefoer, consideration.

It is questionable whether the glass quilt will find a place in a commercial apiary, in view of the essential conditions for its success in the shape of adequate warm packing on the top to prevent the condensation of moisture on the glass. It must be remembered that the commercial beekeeper has to cut down his expenses to the lowest minimum, reserving also as much as possible of his capital. But where such considerations do not exist, beekeepers who have carefully tried the glass quilt speak highly of it. In describing the famous Glassel Apiary, Mr. D. M. MacDonald speaks favourably of the glass quilt as follows†: "All arrangements of the hive interior are the result of careful study and prolonged observation. Mr. Wood believes in ample packing overhead, and uses about as much covering all summer as he does in winter. First, over the frames in each body-box he has a glass quilt with a 3-in. round hole in the centre. This is set in a frame with a $\frac{1}{4}$ in. bee space below the sheet of glass. Formerly a disbeliever in this system of overhead covering—indeed, an out-and-out opponent of the use of glass—since seeing the perfection of these 'quilts' I am a strong advocate of their use. They are not only attractive, and afford an interesting period of observation as to the condition of the

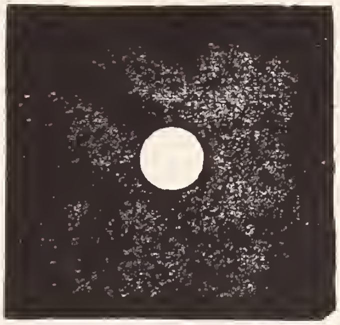


Fig. 41.—Burgess's Glass Quilt.

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† "Humanity to Honey Bees," by Thomas Nutt, 1845.

* In the year 1833, a premium was awarded by the *Cambridgeshire Horticultural Society*, to a Mr. Widnal, for his exhibition of a glass of Honey. But whether the encouragement of Bee-culture was an object of that very respectable society, or whether the reward given to Mr. Widnal on that occasion was a sort of bye-premium, bestowed for the gratification of seeing a curiosity, it did not appear.

† THE BRITISH BEE JOURNAL, Nov. 14th, 1918, p. 371.

bees and brood nest, but they also add to its cleanliness. Each sheet is set into the frame in such a way that the slot affords space for the expansion of the glass, so that it never cracks, of old a grave fault. Brace combs are rarely formed as was previously too often the case, and no dampness is ever found present. Above this quilt are placed two coverings of ticking cloth, neither of which, of course, is ever propolised. Over this lies a thick, carefully made-up cushion of wool shavings, with a hole in the centre for accommodating a circular feeder. When this is not in use the opening is closed by a close-fitting pad. Over these are placed two to four layers of warm blanket or woollen cloths. A loose space in one of these affords room for one or two regularly renewed naphthol balls to keep out wax-moth or other vermin."

The appliance is manufactured and supplied by Messrs. Burgess and Son, of Guinea Street, Exeter, whose neat workmanship doubtlessly is a leading factor in its growing popularity.

THE "MEADOWS" N.S.H. FRAME.

The Meadows "new Slot Hole Frame" is intended to be stronger, easier to put together, and consequently better than the average frame on the market. The accompanying illustration shows the form of construction.

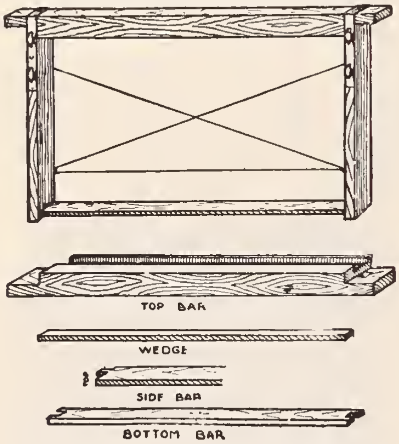


Fig. 45.—The "Meadows" N.S.H. Frame.

The Brood Frames (14in. x 8½in. or 16in, x 10in.) have ¾in. top bars, the ends shouldered to ⅜in., slotted through for side bars. These may be nailed sideways or through the top bar. They have a double slot and wedge for the foundation.

The Shallow Frames (14in.x 5½in. or 16in. x 5in.) are slotted through the top bar similar to brood frames. They have wide grooves for the foundation (not cut through), but no wedge.

A hive frame has a good claim to the best possible material and workmanship, for obvious reasons. In spite of the exceptional industrial difficulties which are still prevalent, Mr. Meadows may be relied upon to give of his best.

THE "MASTER" CANDY FEEDER.

A new candy feeder, manufactured by Mr. S. J. Baldwin, of Bromley, Kent, and designed by Miss H. M. Chester Master, of Thornbury, is now on the market.

It consists of a wooden box of sufficient capacity to take easily a pound cake of candy. It is provided in its base with a bee escape (Fig. 46 a) and with a hole (b) fitted with a sliding shutter (c), and has a sliding cover on the top made of stout glass. (e) A bee space is furnished on the under side of the bottom of the box, which is made to rest on the usual hole in the quilt when the box is in use. Inside the box wooden slots (d) are suspended for supporting the cake of candy.

The object of this feeder is to diminish the loss of heat from the cluster when renewing candy in winter, should candy feeding be indicated. By closing the hole prior to renewal of the candy, the bees are permitted, in the course of one or two hours, to pass down through the escape. A fresh cake is then inserted, the glass slid into place, and the slide drawn back to allow the bees to pass into the feeder with a minimum loss of heat, and without the escape of any bees if the box is fitting properly on the quilt. Nervous beginners will appreciate these advantages.

Another advantage for the feeder is to prevent candy that happens to absorb much moisture in prolonged cold wet weather from dripping over the cluster, especially as during sharp cold weather bees are more likely to cluster on the combs and forsake the candy, this explaining cases of starvation, in spite of the presence of such an artificial food which has not been dissolved and stored in the combs. This ground has already been fully covered in the BEE WORLD.

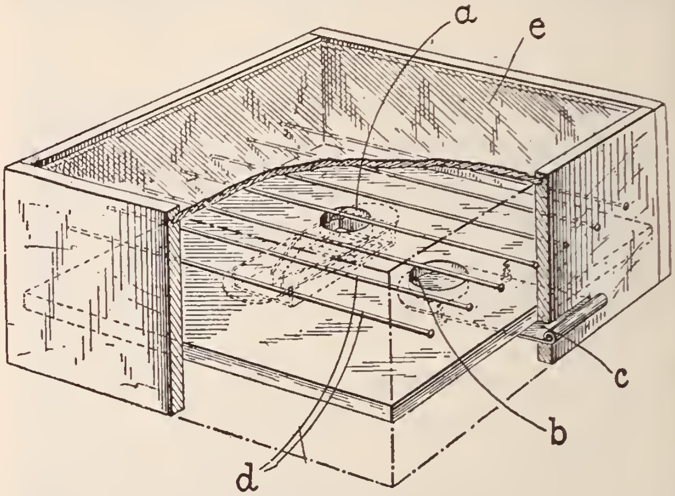


Fig. 46.—The "Master" Candy Box.

The feeder is well made, and is obtainable at a reasonable price.

THE "WHYTE" RUSTIC HONEY DISH.

We have received from Mr. Richard Whyte (of Orme Lodge, Cumbernauld Station, Dumbartonshire), the inventor of the "*Whyte*" *Queen Excluder*, also the "*Whyte*" *Queen Introducing and nucleus cage*, what may be described as an artistic table honey skep.

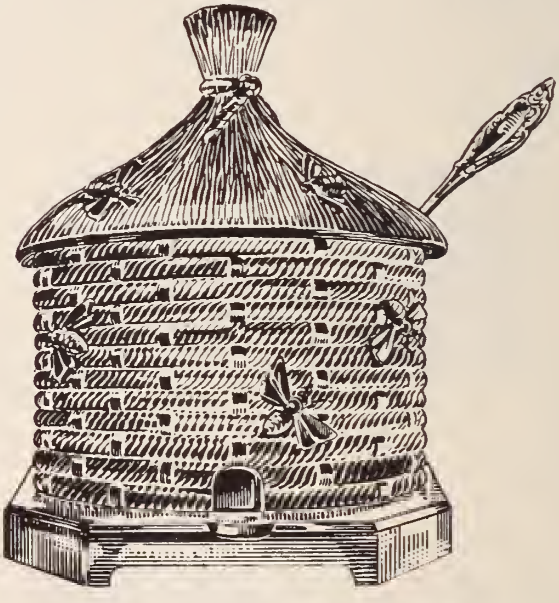


Fig. 47—The "Whyte" Rustic Honey Dish.

It is made of high quality glass, and most cleverly represents a skep on a stand with a thatch-cover lid, in which a cut is made for a honey spoon. The skep and stand are made in one piece.

The foregoing illustration shows the neatness of the design—one of the most artistic and effective that we have seen. A harmony in art was the occupation of the "skep" by about a pound of a most exquisite sample of clover honey fragrant in addition with a proportion of thyme honey, both flora happening to abound at the same time. The smooth grain of the honey and its rare delicious sweetness were amongst the qualifications which won for it four first prizes at the *West of Scotland Horticultural Show* and the *Glasgow B.K.A. Show*. For this rare gift from the gods we are doubly grateful.

The "WILLIS" WAX EXTRACTOR.

This is an economical wax extractor, the design of Mrs. L. Willis, of Sudbury, which has been introduced to the Craft by Messrs. E. H. Taylor, Ltd., of Welwyn, Herts. It has won the first prize for novelties at the 1920 *Dairy Show*.

It consists of a perforated basket which, after being filled with old broken comb, is fastened down in a container filled with soft water and allowed to boil until the wax is dissolved. It is claimed that thereafter nothing remains to be done but to lift off a cake of wax from the surface when cooled, and empty the basket of refuse. But—especially with old brood combs—a second boiling may be required after clearing the first refuse. It requires a comparatively small amount of firing, and its simple and economical features justify recommending it.

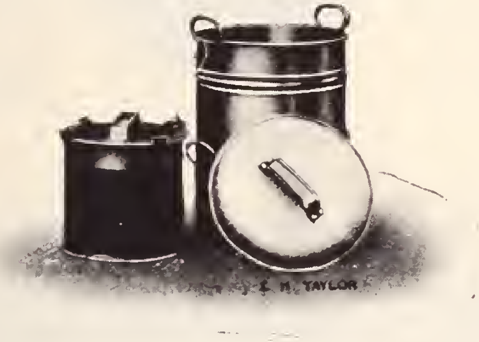


Fig. 48.—The "Willis" Wax Extractor.

THE "HARVESTER" HIVE.

This is the latest attempt at introducing an American type of hive to suit British climate. Previously introduced hives of this type have already undergone modifications in the light of experience, and are sure to end in acquiring some form of accessory to protect the line of junction of any two boxes from the alternating and non-announced adversaries of British climate. To depend on propolising, which, by the way, does not appreciably take place till the close of the season, and the jarring of a hive tool, which is sure in the long run to cause some damage, is not scientific beekeeping. This does not mean that we dispute the great commercial advantage of a simple, single-walled hive suitable for migratory beekeeping, or that bees could be kept by rough and handy methods with variable success. In fact, we strongly believe commercially in a simple hive, as testified to by the hive mentioned in the BEE WORLD for September, 1919 (p. 63), and which was introduced nearly three years ago. But this is quite a different thing from assuring the Craft that it is possible with advantage in these Isle not only to dispense with a water-proof cover, but also with a protector to the lines of junction of the hive boxes. The absurd arguments advanced are more worthy of third-class trade catalogues. Again, it is hardly practical (when supers have to be placed in advance) to suggest that it is wrong to leave a super on the brood chamber if it has no bees in it, as no propolising would take place, and rain would get access to the brood chamber. This contradictory advice, however, is fitting for those who blindly imitate American methods, and when criticised hasten to accuse us of conservatism, ignorance, and the rest of it, as has been displayed lately in one or two contemporaries. Suffice for us to recall the appreciation of none less than Mr. Meadows, who sees in the BEE WORLD an unfettered medium for reviewing without favour or fear the good work of every progressive beeman, without the slightest consideration for school or nationality. It was indeed due to the brain and enterprise of that veteran beekeeper and manufacturer more than anyone else here, that an improvement in the simple box hive on American lines was introduced, and we are sure he will not be behind others in introducing further improvements in the light of additional experience.

It is not out of place also to emphasise that a hive which must be kept level or titling forward, is not an admirable thing from a commercial point of view, when some hundreds of hives may have to receive attention, and a good percentage of which may have to be moved about in the course of the season, or otherwise. In addition, it is a pitiful task to simplify construction on the one-hand, and to burden the beekeeper on the other with a merciless design subject to being readily besieged with vegetation, as subject also to being conquered by cold, rain and wind.

These passing comments may be helpful to the gentlemen who want to subject the progress of beekeeping to their business interests at all costs, with convenient pretences such as the ridicule of everybody who has not been, like them, ignorantly "associated with bees for years," and not having shared them in just beginning to study something about modern beekeeping, and ventilate the new acquisition in all sorts of amusing vanity.

Like Mr. Meadows and others, the object which Mr. Dudley W. Fielden had in view when he originated the "Harvester" hive was to make it more possible for beekeeping in this country to pass from being merely a profitable hobby to that of a commercial proposition, by placing before the beekeeping community a hive which, while being adequate with external packing for out-of-door wintering, would, at the same time, greatly simplify manipulation.

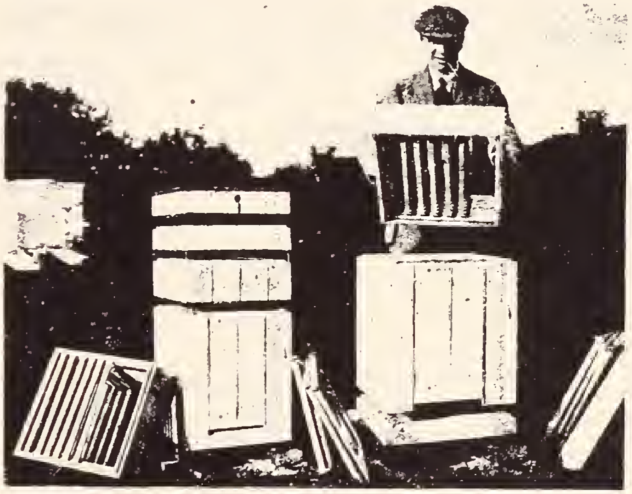


Fig. 49.—This illustration shows Mr. Fielden demonstrating the ease with which supers can be removed and replaced on the "Harvester" hive. A corner of his former apiary at Eastcote appears in the background.

In America, where beekeeping has grown into a large and successful industry, the hives in use are of the simplest pattern, both as regards construction and manipulation, the chief consideration always being suitability for management on such a scale as alone renders any enterprise commercially attractive.

Anyone who has tried, realises the almost impossible task of handling a large apiary composed of the usual double walled hives so largely used in this country. While in a small apiary they may meet all requirements, it is found that as the numbers grow the work becomes laborious while manipulating, and the task of spring cleaning or storing taxes the apiarist and his storage room to the utmost.

The aim, therefore, was to produce a hive which would equal the simplicity of the American single wall hive and yet provide adequate protection to the bees when wintered out-of-doors.

This, Mr. Fielden contends, has been accomplished, and it is claimed for the "Harvester" hive that, owing to its peculiar and novel construction, it combines to a large extent the protectiveness of the double walled hive with the simplicity of the American single walled hive, while the slightly greater cost is more than compensated for by the fact that, whereas the American hive is generally not intended for out-of-door wintering, the "Harvester" is, thereby saving the cost of cellar or case accommodation.

The *claims* put forward in favour of the "Harvester" hive by the originator are as follows:—

1. It affords ample protection to the bees during the winter owing to the special construction of the insulating walls of each chamber with a rebate of ⅜in. to carry the frame ends, having between them a sheet of insulating material.

2. The inner wall being ⅜in. above the outer, and the latter projecting ¾in. below the former, ample protection is given against rain or wind entering between the chambers when tiered up. Also sufficient hold is provided against the upper chambers being blown off in a high wind, by the secure lock caused by the outer wall of the upper chamber fitting over the inner wall of the chamber below. The ⅛in. to $\frac{3}{16}$in. space occupied by the insulating material gives ample margin to ensure perfect ease of manipulation.

3. The eke supplies ample space for quilts and should be used whether the hive is supered or not.

4. The roof is covered with "Ruberoid," and is provided with ventilation holes. It is flat on top, and about 3in. in depth.

5. The floor board carries out the same idea, being constructed of a ½in. platform resting on a stout rim, providing ample hold in case of wind, and, owing to the raised platform, security from damp.

6. The whole hive has no projections other than the wide porch, which is instantly removable. It is, therefore, unsurpassed for moving bees. By means of square staples the floor, chambers, and roof can be firmly secured in a few minutes.

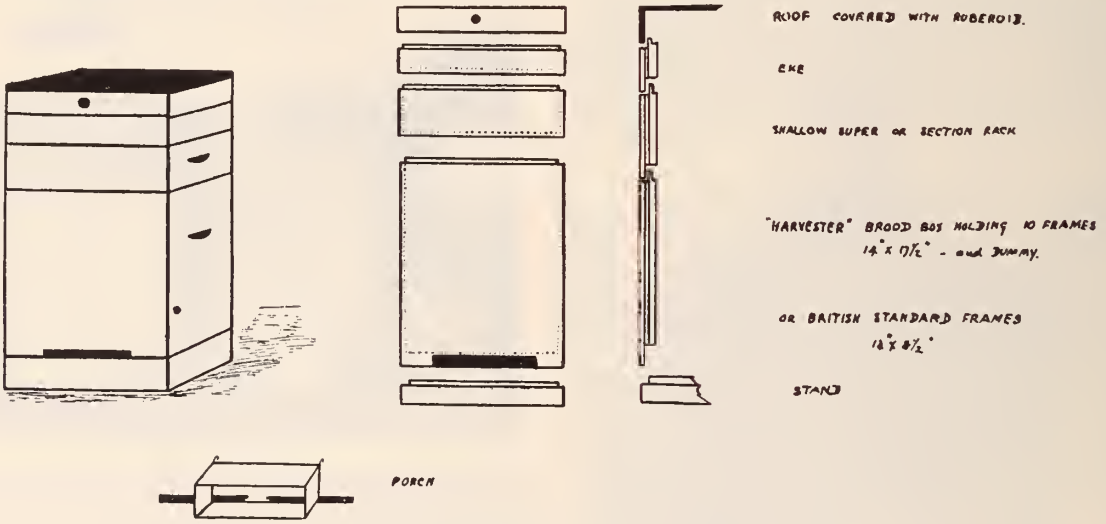

ROOF COVERED WITH RUBEROID.
EKE
SHALLOW SUPER OR SECTION RACK
"HARVESTER" BROOD BOX HOLDING 10 FRAMES
14" x 17½" - and DUMMY.
OR BRITISH STANDARD FRAMES
14" x 8½"
STAND
PORCH

Fig. 50.—The "Harvester" Hive Dissected.

7. The "Harvester" hive is supplied with either shallow extracting frames or section racks. Standard sized extracting frames may be used if desired.

8. The brood box holds 10 "Harvester" size frames, measuring 14in. by 17½in., being equal to two standard brood chambers. While the brood box can also be made to take the usual British Standard frame, 14in. by 8½in., the former is recommended (except in heather districts and those with a poor honey flow) owing to its commercial possibilities; the brood nest, under a good Queen, being capable of great expansion while keeping the nest to one chamber. This is a great improvement over the usual method of endeavouring to get the Queen to work in two chambers, and then having to hunt her up to put her below excluder towards the end of the season. With these deep frames, having a broad top bar, it is rarely that a Queen will be found passing up into the supers above, and the use of the excluder will thereby be rendered unnecessary. A deep frame also gives greater security in wintering, providing as it does for a deep cluster with ample stores above it. It is fully expected that winter losses will be reduced to a minimum by the use of this frame.

E. R. SEADON, ESQ.
Apiarist to the late Lord Avebury.
Managing Director, Baldwin's Factory,
Bromley, Kent.

9. Owing to the internal construction, propolisation is provided against. It is practically impossible for the frames to become fixed to the chamber above as is so often found with the ordinary hives, owing to the sides of the boxes resting on the frame ends. Not only is there a ⅜in. space between the bottom of the frames and the top of those beneath, but a bee space is also provided below the inner walls of the chambers. This arrangement offers so little contact space to the bees that the trouble of propolisation will be reduced to a minimum, the

contact space between the chambers being formed by the outer walls only.

10. There are ample hand holds provided and the spacing of the frames being by staples room is provided for easy manipulation.

11. The "Harvester" frame can be used in the ordinary hives by placing one standard brood box on top of another, while the standard or shallow frames at present in use are of course adaptable to the "Harvester" hive.

12. An excluder, if desired, can rest on top of a chamber without contact with the chamber above. A clearer board is also available, which carries out the "Harvester" principle.

13. While in the accompanying illustrations of the "Harvester" brood box the entrance is cut out of the front of the chamber a new stand is being made which will render this unnecessary, so that when the "Standard" brood boxes are used they can be placed on top of one another when uniting or doubling is desired. While with the "Harvester" size brood box this may not be a very needy alteration, the new stand will be used for the sake of uniformity.

Whilst the choice of beekeepers is bound to vary, according to locality and experience, and whilst the "Harvester," like all other hives, has disadvantages as well as advantages, it is in our considered opinion a distinct step forward amongst its class.

It is being manufactured by Mr. S. J. Baldwin, of Bromley, Kent. The specimen presented to us displays fine workmanship.

THE CUMBERNAULD HIVE.

In the words of Mr. Richard Whyte, its originator, the *Cumbernauld Hive* "has been designed on the lines of absolute simplicity. It is a single-walled hive with internal provision, making it equivalent to double-walled. It is square and can be worked with combs across or at right angles to the entrance.

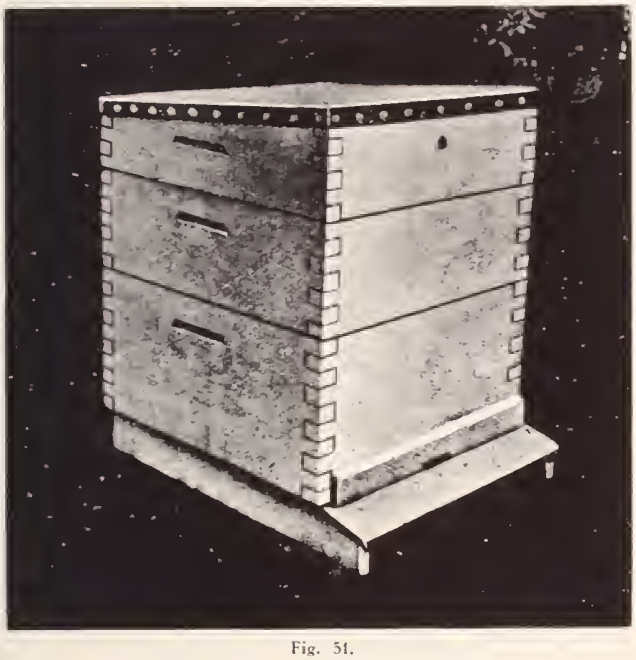


Fig. 51.

The floor board is made without legs, as in his experience legs prove somewhat unsatisfactory after a few years' use. The roof is covered with felt. The brood chamber, supers and roof are all rabbetted, thus making it impossible for rain to soak in. A winter vermin and weather protecting guard, as shown in the accompanying illustration is supplied, which fits into the entrance."

The *Cumbernauld Hive* bears much resemblance to the *Wormit Hive*, of Messrs. Steele and Brodie, in general simplicity and to Fielden's *Harvester Hive* in internal construction, with the exception that the latter further develops the principle of insulation by the insertion of "ruberoid" between the two layers, so to speak, of the hive wall. They are both almost of the same service and adaptability to British climate in the provision of a form of internal plinth to ensure easy and waterproof fitting of the hive parts without depending on propolisation. The reader will be well advised to study Mr. Robinson's article on the "American Type of Hives" in this issue of the BEE WORLD (p. 89) for technical advice bearing on this point.

Mr. Whyte thinks that two layers of wood (without an insulating material in between), plus, if desired, two division boards, one on either side of the brood chamber, provide when wintering sufficient protection at an economical cost. He further prefers staining the hives with a suitable wood preservative, such as "*Solignum*," to painting. Provided such stained hives are located in cold districts or sheltered from the direct sun rays in mild districts, we endorse his preference, both for economical reasons and in relation to good wintering.

A commercial hive of the "Cumbernauld" pattern should be eminently suitable for selling bees in, by providing a wire cloth ventilating board on the top of the brood chamber, covering the whole of the entrance with wire cloth or perforated zinc, and with good clamping of the hive parts. The hive could be turned therefore into a travelling box, with a strong rope, well tied round it, used as handle. The lifts and roof would travel separately. There should be an appreciable gain and convenience to both supplier and purchaser in such a practice.

Trade Catalogues Review.

We have received the following presentations of Trade Catalogues, which we have pleasure in reviewing. The opportunity is fitting for reminding our readers to give their utmost support to our advertisers who, on their part, are doing their best to support our educational work and are tolerant of our suggestions and criticism. Some of them have allowed, and continue to allow, a retail discount to our members on cash terms for three chief reasons: (a) to discourage false economy and encourage investment in good articles, a practice which is of mutual gain to the buyer and seller; (b) a business gain to manufacturers in eliminating credit and its worries in correspondence and booking; (c) a mark of consideration to organised beekeepers which cannot fail to serve as a reminder to those who prefer to think and work separately for themselves, and for themselves alone. *All* our advertisers, whether they see their way to allow a discount on prepaid retail orders to *Apis Club* members or otherwise, guarantee full value in supplies for money paid.

S. J. BALDWIN. The 1921 catalogue of this long established and progressive British firm makes special point of the standardisation of hives. Mr. E. R. Seardon, Managing Director of Mr. Baldwin's factory, gives the following introduction to his customers: "To meet the ever-growing need for standardisation, I am listing only three hives, and to each of these strict attention of details has been given. The '*W.B.C.*' and '*Bromley Kent*' are still kept square. Tops and floor boards are identical with each type, and further all parts of both hives interchangeable. This latter feature I do claim to be a big step towards standardisation." The third hive listed is the "*Harvester*," of which a review appears in this issue; of other noted accessories Baldwin's *New Era Foundation*, *Adminson's Aluminium Semicomb*, and *New Era Queen Mating Hive* may be mentioned.

ENRICO BOZALLA Signor Bozalla is supplying this season both pure Italian queens and nuclei which are of high standard. His well illustrated catalogue is sure to prove instructive to those of our readers who have not seen it. We have personally tested his queens and can safely endorse his claim to quality.

J. T. BURGESS AND SON. Messrs. Burgess & Son are well known for various specialities such as the Burgess Glass Quilt, Sladen's Queen-Rearing Outfit, etc. Their manufacture is also noted to be second to none in Great Britain

EDWARD J. BURTT. Mr. Burtt's bee goods are marked for a quality which commands an unfailing demand and agents. His frames especially are excellently made. Of useful hives tne "Edwards" Nucleus Hive is a treat. Mr. Burtt makes a speciality of bee literature, and his literary list is most embracing.

F. M. CLARIDGE. As a conscientious breeder, Mr. Claridge deserves the popularity which his supplies are receiving His illustrated catalogue is instructive and inspiring. In addition to bees, he supplies useful appliances bearing his name which were previously reviewed in the BEE WORLD

DADANT AND SONS. This celebrated firm, with an international reputation, are the sole manufacturers of Dadant's foundation. Their catalogue gives in addition a list of the standard American supplies and their bee publications. Our readers should have a wider outlook of the beekeeping industry and endeavour to secure and study Dadant's catalogue.

JAMES LEE AND SON, LTD. This leading firm, which owes its success in the first instance to the rich experience and excellent business methods of the veteran beekeeper, James Lee, still commands an unique position in the United Kingdom of wholesale and retail manufacture on a large scale of good bee hives and appliances. Their 1921 catalogue contains as usual a comprehensive list of various well known hives, accessories, and novelties, including Adminson's *Aluminium Semicomb*, the "Whyte" Queen Introducing Cage, etc. Their weed foundation is undoubtedly the most noted in this country.

W. P. MEADOWS. Mr. Meadows is the grand bee man whose extractors, honey ripeners and metal bee goods are met with in almost every apiary in the United Kingdom. His *"XL All Hive"* is too well known to need a description. His fine Queen-Rearing Outfit, Clearing and Wintering Board, Gray's Smoker, N. S. H. Frame, metal spacers, etc., provide choice articles that are fully worth their prices.

PEARSON AND GALE. This newly established firm of bee breeders have issued a creditable catalogue with guarantees for their supplies which should command confidence. We sincerely wish them full success in their enterprise.

ENRICO PENNA. Signor Penna's Queen-Rearing establishment, illustrated in his beautiful catalogue, is perhaps the most famous not only in Europe but all over the world, and we cannot speak too highly of either his methods or products. His chief apiary merited the following comment from Mr. C. P. Dadant after his voyage in Europe in 1913 as recorded in the *American Bee Journal* for January, 1915: "This is by far the finest and best conducted apiary that I have ever seen anywhere, all things considered." Neither Signor Penna, Piana nor Bozalla need special introduction to our readers in view of their reputation, extensive establishments, and well known part in restocking the United Kingdom with bees.

THE A. I. ROOT CO. The current catalogue of this international firm—the largest manufacturers of bee supplies in the world—is truly an educational book and is worth applying for by all our readers. It is posted free of any charge to all applicants. The A. I. Root Co. are the sole manufacturers of the famous *Airco Comb Foundation.*

STEELE AND BRODIE. Messrs. Steele and Brodie, at one time chiefly Scottish manufacturers for Scottish beekeepers, have rapidly become a British firm of first class standing. Their 1921 catalogue, like the previous edition, is full of good things, and their goods, we can honestly testify, bear the "Hall-mark of quality."

E. H. TAYLOR, LTD. We are pleased to note that the company which have acquired this long established firm, reputed to be the largest of its kind in Europe, mean not only to have a claim to scope but also to quality of production—a combination which was rarely met with in the past. Their current catalogue is an excellent list worth perusing.

We naturally look to our leading firms to set an example to others in good production and business methods, including trade co-operation and tolerance, and we sincerely hope, therefore, that the past trade jealousies and party strife will never be allowed to revive. We cordially wish Messrs. E. H. Taylor, Ltd., a grand success in their big venture.

R. WHYTE. The championship of the Dutch bee, for which Mr. Whyte is known, receives an illuminating tribute in his catalogue, which is a literary and practical treatise on this hardy race of bees. One well-known beekeeper informs us: "I am finding that Dutch bees can be so housed that swarming rarely occurs—this once prevented, honey and beautiful white wax is the result." Mr. Whyte purposely encourages swarming and re-hives his swarms after removing the virgin queens, so as to gain both in queens and in the added vigour of his bees (characteristic of swarm bees) for honey production. This method may or may not suit beekeepers other than in late districts, and decidedly will not suit large honey producers. But there is no doubt that by judicious manipulation and the independent incubation of the capped brood, as advised editorially, the economical value of the Dutch bee can be greatly increased. Interested readers are strongly recommended to read Mr. Whyte's brochure which also includes a description of useful appliances and accessories bearing his name.

* * *

We have endeavoured in the above notes to give the good points of all catalogues brought to our notice. Critical comments will duly accompany the future review of helpful appliances.

The Bee Laboratory.
W.S.K.

Science is nothing but trained and organised common sense.—HUXLEY.

KILLING SPECIMENS FOR DISSECTING.

By Miss Annie D. Betts, B.Sc.

It is possible to make use of dead bees for the study of many points of external anatomy; but they are too much decomposed to be of any value for internal anatomical work, or for the preparation of slides that are to be kept as permanent specimens. It may, therefore, be of use to describe some satisfactory ways of killing bees for the above purposes.

By far the best way is to use chloroform. My method is as follows: The bee is captured in a glass-bottomed pill-box; the lid of the box is then moistened with a drop or two of chloroform, and the box is placed lid down on the table for a minute or two. If chloroform is not available, immersion in methylated spirit is another good way of killing. The process can be made nearly instantaneous by using the spirit hot, or by adding to it a little Congo Red solution. This dye (a 2 per cent. solution in 50 per cent. alcohol) is recommended by Zander as a permanent stain for chitin; it is useful in dissecting, as it colours thin chitinous membranes, such as trachae, thus rendering them visible. When used for killing bees, as above, it sometimes penetrates into the tracheal sacs, replacing air that is expelled by the bee, and makes their dissection much easier.

MISS ANNIE D. BETTS. B.Sc.

For nearly all purposes, bees newly killed are better than those which have been preserved in alcohol or formalin. In particular, it may be mentioned, that chloroformed bees often die with their mouths partly extended, in a convenient position for examination. In any case, these and any other parts can be disposed of as is required, since the chloroform leaves them flexible; whereas in alcohol specimens the articulations are rigid, and any attempt to bend them results in breakage. The glands, and the digestive system in general, are also better seen in fresh specimens.

THE BEE'S EGG AND PARTHENOGENESIS.

Miss Betts has raised the interesting question as to the reason for the occurrence of bees which exhibit in some parts male, and in others, female sex characters, and she suggests as a possible cause, delay in the union of the sperm and egg nuclei until the latter has already undergone mitotic division. It may be of interest to point out that there are other circumstances which may also give rise to these "freak" bees, or *gynandromorphs* as they are called. (In passing it may be noted that the term "hermaphrodite" is not strictly applicable in these cases. The latter word implies an individual actually capable of functioning as both a male and a female).

According to Morgan (*"Physical Basis of Heredity"*) sex in the bee, in common with most other forms of life, is determined not so much by the total number of chronosomes in the cells of the individual, as by the number of sex chromosomes present. The female has two of the latter—represented by "XX"—and the male has but one—"X." This is also the case in the vinegar fly (*Droso phila melanogaster*), but in this insect, parthenogenteic development does not take place, as it does in the bee. Morgan has demonstrated by suitable mating that "the great majority of gynandromorphs result from the dropping-out of one of the sex chromosomes at some early division of the fertilised egg." This, he showed by mating a male vinegar fly with a recessive mutant sex-linked character (yellow body colour is the character he mentions) to a normal female. In this case, when a *bilateral gynandromorph* arose, it was found to be yellow on the side which was male, corresponding to the single x chromosome carrying the gene for yellow (thus proving fertilisation), and on the female side the colour was normal, there being here the two x chromosomes, the maternal one of which carried the dominant gene for normal colour, which masked the recessive yellow carried by the other. In addition, when one parent was *homozygous*, or "pure" for any given mutant character not sex-linked, that character, or the normal of which it was a variant, appeared in both halves of the gynandromorph, thus proving that chromosomal division had been normal in all except the X.

This showed that the freak was due, not to faulty fertilisation, but to an irregularity at a later stage of embryonic development, when in the course of a nuclear division, one X chromosome failed to pass into one of the daughter cells, leaving the latter with only one, i.e., male. The descendants of that cell would, of course, all have only the one X.

Morgan suggests a further possible way in which gyanadromorphs may occur, and that is when an egg contains two nuclei, as sometimes happens. He does not put forward the explanation proposed by Miss Betts, and, after all, the possibility of a daughter nucleus from the division of an egg nucleus being "fertilised" after it has ceased to be really a gamete, seems more remote than the possibility of the accidental loss of a chromosome in one of the many subsequent divisions.

The question has a practical aspect. If Miss Betts's explanation be accepted, the occurrence of a freak bee of this kind in a hive would, as she suggests, lead us to doubt the efficiency of the queen. With Morgan, we would simply dismiss the event as a rare accident of no particular significance.

It is to be hoped that readers will report all cases of this nature in detail, as it is desirable that we should discover whether or not these happenings tell us anything at all about the condition of our queens.

DELTA S.

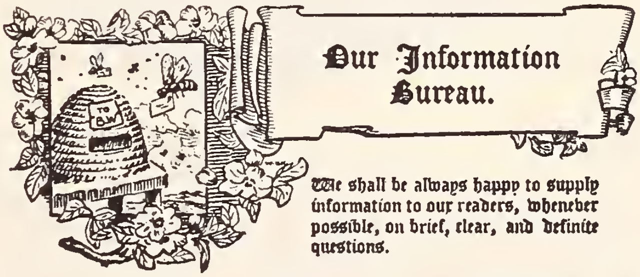
[Miss Betts comments on the foregoing communication as follows:—

I have no doubt that "Delta S." is right that "gynadromorph" is the more correct name for these "freak" bees. I used "hermaphrodite" as being more familiar to beekeepers.

Our thanks are due to "Delta S." for calling attention to Morgan's most interesting results. My suggestion as to the origin of gynandromorphs was merely tentative; and I daresay "Delta S." is right in saying that it is highly improbable (if not impossible) for a nucleus other than a gamete to be fertilised. Unless some facts to the contrary are discovered, we may, I consider, accept Morgan's explanation of the origin of gynandromorphs.

I do not, however, agree that his theory renders a queen that produces occasional "freaks" less liable to suspicion as to her efficiency. The dropping-out of an x-chromosome may be due to some external cause, such as faulty nutrition; but it would be at least possible that it was due to some defect in the mechanism of either the ovum or spermatozoon. In this latter case, I should suspect the queen (or the drone she mated with) of a constitutional (and probably hereditary) defect; a much more serious matter, practically, than loss of efficiency due to old age, as it would be likely to reappear in queens bred from her at any period of her life. It would be interesting to know whether the queen daughter of a queen that frequently produces "freaks" do inherit this tendency.]

* * *



Our Information Bureau.

We shall be always happy to supply information to our readers, whenever possible, on brief, clear, and definite questions.

The seeds of knowledge may be planted in solitude, but must be cultivated in public.—JOHNSON.

PROPOLISING. The sample of "scrapings" represents propolis. Bees, which heavily propolise, sometimes leave marked traces of their loads at the entrance. These are occasionally mistaken by beginners for dried excrement. As to the removal of propolis from the corbiculae, the observatory hive has repeatedly shown us that the loaded bees do *not* get rid of their loads in the same way as when unloading pollen, which is the usual teaching. We notice that they stand still and are relieved by other bees gradually biting away their propolis loads and depositing it where required.

BALLING OF QUEENS. Some races of bees, notably the Dutch, would ball their queens at the slightest provocation during unfavourable weather, and rarely during favourable weather, except when following adverse conditions. On the other hand, during the honey flow, the mother queen of the colony is almost immune from this misfortune. Italians are not free from this defect. Carniolans have greater regard for the queen.

COMBS JOINED TOGETHER. In the Autumn, the partial joining of combs together, even when these are correctly spaced, is often practised. The result is the creation of a partial wax cover at the upper part of the space between the combs, and of winter passages. It is an attempt to compromise between the convenience of man and the convenience of the bee, which latter is fully demonstrated in a skep.

SELECTION OF BREEDING CELLS. Yes; the Queen Bee apparently *does* select her cells for egg laying. If you will examine with a magnifying glass the bases of the cells of a comb, especially if newly built, you will see that the surface is roughened, and if the comb is old it exhibits signs of polishing and cleansing. The queen generally avoids a cell, whether started or complete, which is not sufficiently prepared for her. She also generally avoids cells with irregular bases and those in a comparatively cold part of the hive, except in settled warm weather, when a uniform temperature is likely to be maintained. Given side by side a wax comb and a metal comb or one built on metal foundation, the Queen will probably lay in the wax one first, or restrict its laying to it, not on account of substance so much as on account of temperature or preparation, or both. Fortunately, under modern beekeeping conditions, the Honey Bee is not working within nature, but without it, and it is a case of intelligent compulsion that makes the artificial comb useful.

BEES IN PAINTED SKEPS AND COLD. When we suggested painting skeps we had already acted on the suggestion ourselves. Bees winter well in painted skeps; the paint, however thickly put on, within reason, does not entirely remove their porous nature, and yet affords admirable protection from rain. Thatching or accommodation in an empty hive is an additional advantage.

We do not find bees in Dutch skeps wintering worse than those in the orthodox English type. During the autumn they generally close the high entrances of the former with a curtain of wax and propolis (with one or more bee holes left), which they pull down in the spring.

We feed a colony in a Dutch skep with candy in a shallow box placed on the back part of the floor board. The method is not scientific, but is convenient from a commercial point of view.

"BROWN CANDY." If we are correct in our impression that this is made of impure cane sugar with possibly a percentage of glucose, then it is decidedly unfit for bee feeding. It will kill more bees than save. Pure glucose, a substance which is more to be found in scientific laboratories, is not considered harmful to bees. But commercial glucose is a different thing. It may contain arsenic as an impurity.

QUEEN CELLS PROTECTORS. These are not generally made large enough to take well-developed queen cells, even after trimming superfluous wax which does not rightly belong to the base. The apex of the cell is intended to correspond to the apex of the protector, which again is not often made sufficiently wide. After fitting the cell within the protector, the latter is intended to hang down between two frames closely spaced or may be stuck in a convenient top part of a comb, provided a frame with foundation or non-bulging comb is placed on the opposite side, so as to give sufficient room for clustering bees and avoid accidents. Altogether we prefer for this purpose the *Meadows wire cloth nursery cage*, previously illustrated in the BEE WORLD (Vol. I., p. 247).

LARGE BREEDING COMBS AND HEATHER HONEY PRODUCTION. It is rightly said that small breeding combs are necessary for heather honey production, for the simple reason that this synchronises with the advent of cold weather when breeding is at a low ebb, unless an active young queen has been previously introduced. With large combs, we suggest, as a remedy, *contracting the brood chamber by the use of detachable insulating walls*, each taking the place of, say, 2 or even 3 frames if possible. This replacement of empty brood-chamber combs with removable insulating walls serves on the one hand to make the brood chamber warmer, and this stimulates the breeding of young bees, which are invaluable for wintering purposes; on the other hand, by contracting the brood chamber the bees are forced to enter the super and start preparing for the foragers. Needless to say, such contraction of the brood chamber should be done *on the spot.*

HEATHER HONEY FOR WINTERING. By "heather" honey is generally meant honey which predominently comes from heather. Owing to its impurity, it therefore granulates. Granulated honey, during *non-frosty* weather, should be no worse than candy; but during frosty weather, with no water available for dissolving it, and the bees in a state of close clustering, it does not seem to us strange that bees may then starve in spite of the presence of such stores.

We commend this little analysis to those who find a lot of nonsense in our assertion, based on a large scale of observations, that candy feeding in winter is successful only when there are additional stores in the combs or during mild weather that permits the bees to dissolve and store the candy.

PUNIC BEES. We have no experience of Punic bees. They are reputed to be hardy and good foragers, though also big swarmers. In temper they resemble Cyprian and Egyptian bees in being exceptionally bad tempered during unfavourable weather. They again resemble Cyprians and Egyptians in the watery capping of stores, and therefore are only suitable for run honey. They have the distinction of being excessive propolisers, a feature which after all is not a disadvantage here, especially if they are only to be used for extracted honey. For additional information, see the BEE WORLD, Vol. I., p. 77.

INCREASE. Gradual increase and partial honey production is a more profitable thing than rapid increase, which, unless for sale, means sinking capital in feeding and running the risk of wintering weak colonies. On the other hand, timely rapid increase, coupled with distribution in suitable out-apiaries, should prove, with proper attention, a profitable enterprise, with less sinking of capital. All the skill of management and labour would be nuulified, should obstacles arise, and it is generally advisabe either to increase slowly or to be sure otherwise of your essential conditions.

TRANSFER OF BEES FROM INFECTED DISTRICTS. Surviving bees from infected districts are considered by more than one authority as invaluable. Before transferring, it is morally right, by the expert examination of adequate samples, that you should be sure of the absence of (1) infectious brood diseases, (2) Nosema Disease, and (3) Acarine Disease. The last two respectively attack the alimentary and respiratory systems of adult bees.

We do not agree about the wholesale destruction of colonies in an infected district, although we certainly favour the *autumn* destruction of infected colonies, as suggested by Dr. Rennie. Wholesale destruction of innocent and infected stocks is a ludicrous proposal and, so far as we are aware, bears a commercial origin. It is all very nice when it comes from the very people whose carelessness in beekeeping is a well known example of one chief method for spreading disease, and a strong argument for the necessity of legislation.

YIELD FROM WHITE CLOVER.

Districts in which white clover is the only main source of yield cannot be described as rich, and will never compare with those in which several small crops yield in succession. Comparisons of "take" are valueless and misleading unless under identical conditions. A beekeeper in a poor district securing no more than 25lbs. of honey per colony by good management may be more of a successful beekeeper than one obtaining in comfort 40lbs. per colony in a first-class district. "The greatest trouble with white clover," as the late Dr. Miller said, "is that some years it will bloom abundantly, but yield no nectar. One year, instead of getting a crop of honey, I had to feed my bees with 2,800lbs. of sugar to keep them from starving."

"YADIL" IN ACARINE DISEASE.

We are not responsible for trade claims. We have never suggested that "Yadil" is a specific drug for one or more of the bee disease, as has been done by the introducers of "Bacterol," "Flavine," "Izal," and the host of other so-called "cures." Extended trial would alone establish its exact merits. We have merely recommended its trial as well as its use as a food preservative and a general harmless antiseptic in the apiary, especially during the manipulation of different colonies. Considering the diffusive character of this antiseptic, its non-toxic vegetable origin, the valuable therapeutic properties of garlic (from which it is primarily derived), especially in toxaemias, it is logical that one cannot deny its claim on the interest of the researcher and the scientific beekeeper. We contend, therefore, that whenever an antiseptic is indicated in the control of bee diseases, and where toxicity is to be avoided, no better preparation than *Trimethenal allylic carbide* (Syn.: "Yadil" Antiseptic) could be chosen. That this or any other preparation could be expected to do miracles when gross pathological lesions are present is ludicrous; but in the early stages of infections it may be helpful. In the absence of correct statistics the trade claims to which you refer are not, in our opinion, justified. The favourable reports (with few exceptions) published in the Press justify, however, extended trial with scientific care both in conducting experiments and tabulating results. The recent classification of *Acarine disease* and the possibility of discovering the causative mite, *Tarsonemus Woodi*, at a very early stage will now help to show whether "Yadil" given internally in *strong* doses (the dose recommended by the manufacturers is, in our opinion, insufficient), and used in sprays, will be helpful or otherwise. It must be remembered that although the site of infection in Acarine disease is intra-tracheal, the diffusive character of the antiseptic and its anti-toxic properties in many infections still justify its internal administration. This, however, does not exclude its usefulness in the shape of a spray or vapour within the hive. *"Yadil Therapy"* (published by Messrs. Clement and Johnson, Ltd., 19, Sicilian Avenue, London, W.C.1) is a suggestive little book, which is sure to interest you and supplement this reply.

Fig. 52.—A Cottager's Apiary in England.

Some beekeepers abroad who are not much troubled with bee diseases, cannot understand the attachment of beekeepers in this country to the antiseptic bottle and sprayer. Perhaps the following remarks will explain.

INDEPENDENT QUEEN INTRODUCTION ON A METAL COMB OF BROOD.

A metal comb possesses in a hive the temperature of that particular hive. An elementary knowledge of physics is sufficient to support this statement. Hence our consistent insistence on the use of good packing and insulating hives (or detachable, insulating walls with ordinary hives) whenever metal combs are employed, so as to preserve a normal hive temperature. Those who do not follow these simple directions and use too many combs at a time, which cannot be covered by the bees present, have only themselves to thank for any disappointment in results, and the bees to congratulate if success is achieved in spite of such carelessness.

Regarding independent queen introduction over emerging brood, this could be safely done with a strong colony, whether by means of a brood-hatching chamber, or a frame cage. For greater economy the following cage may be preferable, especially when it is not contemplated to raise a nucleus.

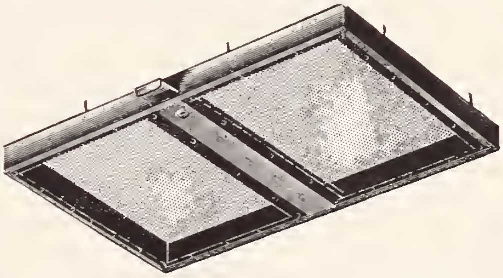


Fig. 53.—The A.Z.A. Semi-Nucleus and Introducing Cage.

It was introduced in November, 1919, for use with metal foundation. The commercial product finally achieved in the form of the "Semicomb" may justify its appearance on the market. The fundamental principles on which it is based are: (1) The selection of emerging bees for early association with the new queen. (2) The economical restriction of only one side of a comb to the introduction of a queen and the raising of the start of a nucleus. (3) The saving in weight, material and cost, as the design will show, compared with a complete cage accommodating a whole frame. (4) The provision of sufficient room within it for the emerging bees, on release, to move about without infringing on the space around the front, back or bottom of the frame, thus avoiding interference with the movements of the colony within the hive. (5) The possibility of introducing two queens on the same comb by utilising two cages, one on either side, and later raising two nuclei; no difficulty lies in the way of quick attachment or detachment, since "nail-pins" pressed in the frame by the grip of both hands, one on either side, affect the former, and an ordinary hive tool or the flat surface of a screw driver will effect its detachment.

The fact that metal is a good conductor of heat should be turned into an advantage in the hive. By using only one cage, the clustering bees on the other side of the metal comb, apart from the general temperature of the hive, will ensure for the capped brood successful hatching. In warm weather it is certainly permissible to use two cages with one metal comb of brood for introducing two queens.

The cage is equally serviceable with a wax comb. When the comb fully extends to the frame bars (see Mr. Claridge's article in this issue on "The Production of Good Worker Combs," p. 88), one cage is sufficient, otherwise two cages as aforementioned may be used with equal success, but naturally limiting introduction in the later case to one queen.

FOOD FOR TRAVELLING QUEENS. This indeed is a very important item. Well made cane sugar-honey candy of the best quality is essential for good results. Considering the established fact that the nutritive value of royal elly could be preserved for more than a year in the shape of a honey mixture, we would suggest incorporating royal jelly, when available, in the candy for queens travelling long distances. *Royal Jelly Candy* may be also useful for the early feed of hatching queens under artificial conditions.

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☞ Notices

Diagnosis of Adult Bee Diseases.—Live specimens may be sent in match boxes or cheap cages for examination and report *free* of charge to Dr. John Rennie, Marischall College, Aberdeen.

Where to Stay.—Visitors to Benson will find comfortable accommodation at "The White Hart." The nearest railway station is Wallingford, G.W.R. There is an omnibus as well as a boat service between Wallingford, Benson, and Oxford.

Books and Specimens.—Gifts of books and interesting specimens to the Apis Club Library and Museum will be gratefully received and duly acknowledged in the BEE WORLD. Donations received during the current year will be acknowledged in the next issue of the paper, which will appear punctually on May 15th, and with it the second volume terminates. Following issues will appear mid-monthly.

Back Numbers.—With the exception of a solitary copy of the first volume and a single file of the second, the manager of the BEE WORLD regrets that back numbers of the paper are entirely out of print. Those in need of the first volume or of separate numbers are recommended to advertise for their requirements.

Free Bulletin.—We have a limited number of Mr. Tinsley's brochure, "*Some Bee Diseases,*" for free distribution amongst our readers, on receipt of large stamped addressed envelopes.

Bee Flora.—Readers are recommended to apply to Messrs. Sutton & Sons, Reading, for one of their special collections of seeds of flowers for bees, *mentioning the* BEE WORLD when applying. They charge 7s. for 24 varieties, 3s. 6d. for 12, or 2s. for 6. These flowers are of appreciable value in an apiary for early stimulative feeding.

Our Information Bureau.—Since last October over 430 questions of technical and literary character have been received and answered by post. In most cases correspondents forgot to enclose stamped addressed envelopes as requested. This neglect burdens our postal expenses. In future we shall be compelled not to answer enquirers who do not conform to our rules. Practically all enquiries are of ordinary character, requiring no special mention in the BEE WORLD.

Apology to Contributors.—We much regret that the limits of our space compelled us to defer the publication of many able contributions from leading beekeepers, both in the United Kingdom and abroad, till following numbers.

Publicity Leaflets.—Readers of the BEE WORLD desirous of further popularising the paper and increasing its circulation by recommending it to beekeepers and would-be advertisers can have *free* leaflets and specimen copies (when available) on application to our office.

Aluminium "Semicombs" for Exhibition.—We regret we have no spare specimens to loan at present.

Subscriptions.—Members of the *Apis Club* whose subscriptions have become due are reminded that the minimum fee adopted since May, 1920, is 10s. 6d. to individual beekeepers, and £1 1s. to Beekeeping Societies and Business Establishments.

Free Virgin Queens.—Mr. Arthur M. Sturges, of Hartford, Cheshire, a well-known queen breeder in this country, is offering gratis this season a limited number of good virgin queens to members of the *Apis Club* in Cheshire.

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Mid Monthly.
THE BEE WORLD
BENSON, OXON..

THE OFFICIAL ORGAN OF THE APIS CLUB.

Edited by A. Z. ABUSHÂDY, F.R.M.S.

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BOARD OF COLLABORATORS.

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Literary Correspondence.—Literary correspondence should be addressed to the Editor, accompanied by a stamped addressed envelope when a reply is expected. In view of the character of this magazine and the almost overwhelming occupation of the Editor, he relies on the co-operative spirit and good nature of corrrespondents in avoiding on the one hand unnecessary correspondence, and in helping on the other to reduce the postal expenses of THE BEE WORLD and *The Apis Club*, which are exceptionally heavy.

Having regard to the limitations of our space, our able contributors will greatly assist by considering 500 words a maximum limit for any single contribution as an article. Letters to the Editor for publication should be very brief.

Business Correspondence.—All business correspondence should be addressed to the Manager of THE BEE WORLD, who will be pleased to reserve advertisement spaces for members of the Trade on application. Rates for displayed advertisements are as follows:—

(1) **Front Page**: £6.

(2) Other publicity pages:—

Full Page	**Half Page**	**One-third Page**
£5 0 0	£2 15 0	£2 0 0
Quarter Page	**One Inch**	**Half Inch**
£1 15 0	£1 5 0	£0 15 0

Subject to space not being reserved. A discount of 2½ per cent. is allowed on three successive insertions; of 5 per cent. on six insertions; and of 10 per cent. on a regular advertisement for one year or more.

The text of a *regular* advertisement may be altered quarterly, free of any additional charge.

The Supply of the Magazine.—Subscriptions to THE BEE WORLD are limited at present to members of *The Apis Club* who are entitled to the free delivery of the paper. Non-members can obtain copies from their newsagents or from firms dealing with bee supplies at 9d. per copy, postage extra.

Beekeeping Societies having official memberships in the *Apis Club* can obtain in bulk copies of the paper at the special rate of 6d. per copy (minimum: 12 copies), post free.

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Keep Your Business Before the Public.

With the leading circulation which THE BEE WORLD possesses we can safely say that regular advertising in it makes two customers grow where one grew before. Advertising is to business what steam is to machinery—the grand propelling power. If you have no luck, it is probably your own fault; luck is often a matter of courage. Book at once a small regular advertisement. The cost is comparatively insignificant; the gain is a compound interest.

◆

Special Prepaid advertisements by members of THE APIS CLUB are inserted at the rate of one penny per word; minimum: one shilling. For non-members: 3d. per two words; minimum: two shillings. For box number: 6d. extra. A discount of 2½% is allowed for 3 insertions; of 5% for 6 insertions; and of 10% for 12 or more insertions. Advertisements must reach us not later than the first week in each month for insertion in the corresponding month's issue.

GET A BROADER BEEKEEPING OUTLOOK—By subscribing to *Gleanings in Bee Culture*—has the largest circulation of any bee publication in the world. Edited by some of the world's foremost beemen. Price $1.30 per year Published by the A. I. Root Company, Medina, Ohio, U.S.A.

THE "ROYAL CARRIAGE QUEEN INTRODUCING APPARATUS."—The latest device for indirect queen introduction. A valuable, durable appliance which is intended for frequent use over many years. The best material and workmanship displayed. 2s. 9d. each, post free. 10 per cent. discount to fellow members of *The Apis Club*.—E. W. Dempster, 169, Balfour Road, Ilford, Essex.

LANTERN SLIDES ON BEEKEEPING.—Photomicrographic Slides of the anatomy of the Honey Bee. Slides showing practical manipulation. Prints on approval.—Rev. G. H. Hewison, M.A. (First Class Expert B.B.K.A.), Marr Vicarage, Doncaster.

RABBITS.—Several pairs wanted. Beveran's, Belgian hares, etc. Must be good. Particulars, price, etc., to Whyte, Bee Farm, Cumbernauld, Dumbartonshire.

INSURE AGAINST DISAPPOINTMENT—by getting your queens and bees from a place where Acarine Disease has *never* existed. Italian queens and 3-frame nuclei, hardy and vigorous, bred for years in a cold North climate. List free.

IRISH HONEY—gathered principally from bramble, clover, and wild raspberry; well ripened and matured; in tins 7lbs. to 56lbs. each. Prices on application.

5 per cent. discount to members of The Apis Club ordering bees or honey. Members when ordering are requested to forward their cards.—S. Crawford, Apiaries, Castlederg, Co. Tyrone, Ireland.

VIGOROUS AND PROLIFIC AMERICAN—ITALIAN STRAINS.—Selected for temper and working qualities. Gentleness guaranteed. Nuclei on 3 to 5 frames. Delivery from April onwards. Virgin, mated, and selected breeding queens.—Sturges, Hartford, Cheshire.

NEW ERA FOUNDATION.—The high class foundation with over 40 years' reputation. A trial sample, however small, will make it your *favourite*.—S. J. Baldwin, Stanley Road, Bromley, Kent.

CLARIDGE'S BROOD-BOX CONVERTING RIMS.—Beekeepers interested in the development of larger hives can experiment with larger frames at slight expense by using *Claridge's Brood-Box Converting Rims*, which will adapt ordinary standard hives to take either 14in. by 12in., or 16in. by 10in. frames. Special sizes made on request. Particulars from sole maker: F. M. Claridge, Copford, Colchester.

N.B.—These rims are registered and copyright.

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Safe arrival of Queens and Nuclei guaranteed. Any Queen that may be lost from a Nucleus within three weeks from delivery we guarantee to replace. Every Queen is warranted for a Six Months' trial, and 1921 reared.

HUGE SUCCESS IN IRELAND.

"I shall come to you again for bees next year. The Nucleus you sent me was a huge success." E. O'B.
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"WHITE STARS" ON TOP: IMPORTED ITALIANS A BLANK.

"The 'White Star' queen has done well. She has twelve 16 x 10 frames and twenty-four Standard frames. At present she is keeping to the 16 x 10 frames, the next (Standard chamber) is filling with honey, and the third nearly all sealed. My imported Italians have done nothing." Rev. R. D.
Mann., Co. Galway, 1920.

GOING AHEAD.

"The Nucleus you sent me is a very fine lot. Already they are on seven combs." (July 3rd.) W. C.
Cedar Road, London.

SPLENDID LOT: ONLY ONE DEAD.

"The Nucleus is a splendid lot, and I am delighted with them. I only found one dead bee." J. R.
Aintree, Liverpool.

SWARMING CONDITION—EARLY APRIL.

"When doing expert work for the Cheshire Association I saw a 'W.S.' stock—such a lot as I never saw before. It was in early April, 1919, and they were at swarming point—absolutely bunged up with bees and brood." H. B.
Bowdon.

FIVE WEEKS—A STRONG STOCK.

"The 'W.S.' Nucleus you sent me five weeks ago is going strong, and, in spite of inclement weather, and little attention through illness, it is now a good strong stock." J. L. N.
Teddington, August 1st, 1920.

APRIL 12th: READY FOR SUPERING.

"The 'W.S.' queen I got from you last year has done splendidly. She has wintered well, and is ahead of any I have got, or any I have seen around here. I am extra well pleased with her."
Tarbolton Station, Ayrshire. J. S.

"W.S." STAND FAST: DUTCH ITALIANS, NATIVES, GO UNDER.

"I am very pleased with the 'White Star' Nucleus I had last year. It has wintered splendidly, and going ahead very fast. I have lost eight other stocks this spring—Dutch, Italians, and Blacks." C. L. W.
Knutsford.

HOW TO FIGHT "I.O.W." DISEASE.

"The 'W.S.' queen sent me in July I gave to a stock that had dwindled to three frames of bees. In a month she had banished all traces of 'I.O.W.,' and filled eight Standard frames solid with sealed brood. I have put them into winter quarters—ten frames packed with bees; a long way my best stock."
Sheffield. G. B.

"W.S." NUCLEUS BUSIEST AND STRONGEST.

"The Nucleus you sent me June 23rd is the strongest and busiest lot of bees I have, and never think of weather conditions. I am speaking to friends daily about them." T. R.
Ormskirk, August 27th, 1920.

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"Disease has emptied this district of native bees. I turn to you as the only source of resistant bees, so far as my experience goes. In my home district also disease has been rife, and none but stocks with 'W.S.' blood survive in my apiary there." H. E. L. V.
Rhyl, N. Wales.

OUT OF THIRTY STOCKS—THREE "W.S." ALONE SURVIVE.

"It may interest you to know that out of thirty stocks in the spring of 1916 only **three** have survived the 'I.O.W.' disease—the only stocks I had of the 'W.S.' blood."
Penrith, Cumb., September 5th, 1917. W. V. S.

A CANDID CONFESSION—ANOTHER OF THOSE MYSTERIES.

"I must make a confession. I put the 'White Star' queen in a diseased 'I.O.W.' hive, treating it with Izal, as you advise, just to see whether you were right. Well! you ought to see them; they are almost the strongest hive I have now. It was almost cruelty to put her in such an attenuated hive. . She is a marvel." E. W. B.
Winchcombe.

ONE "W.S." QUEEN—ONE SEASON—FIVE STOCKS, AND 142 LBS. HONEY.

"I think the 'W.S.' are the most prolific bees I have ever had. I have five stocks and 142 lbs. of honey for the season from one queen." L. Q.

A WEAK FOUL-BROOD LOT REGENERATED, AND—100 LBS.

"The second 'W.S.' was introduced to a very weak lot affected with foul-brood. Nevertheless, she built them up to a very strong colony, and gave 100 lbs. In spite of the foul brood, this became the strongest colony I had." L. Q.
Isle of Man, November 9th, 1900.

JUST WALKED OVER DISEASE.

"I introduced the 'W.S.' queen in June last (1914), and, although the stock was badly smitten with foul brood, they came on all right. Now during this last winter I have lost all my hives (nine), except this one, with 'Isle of Wight' disease, and they are working well, with no sign of either disease."
April 7th, 1915. H. A. N.

EXCEEDS 500 PER CENT. INTEREST.

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Do you get the full results of their work? If not, send to me for Hives and Appliances.
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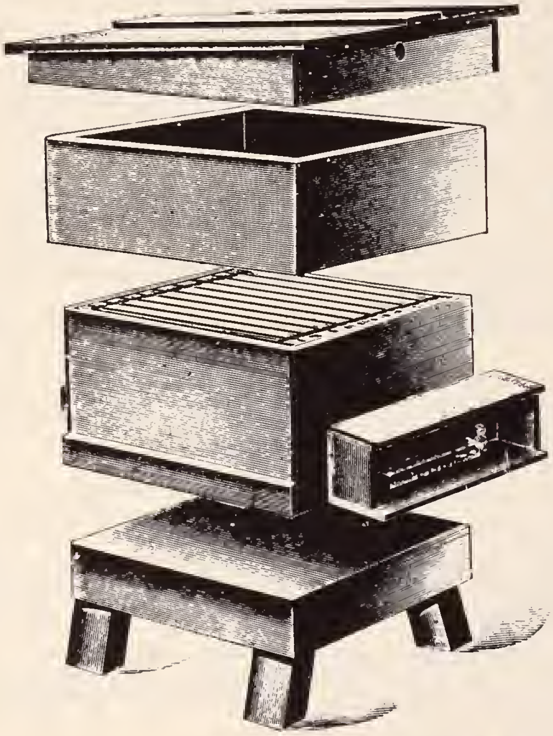

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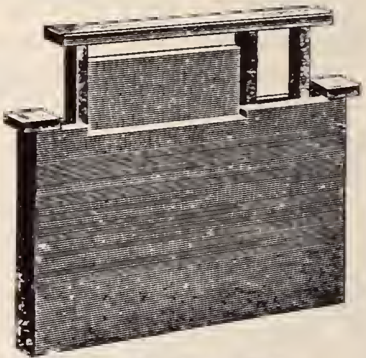

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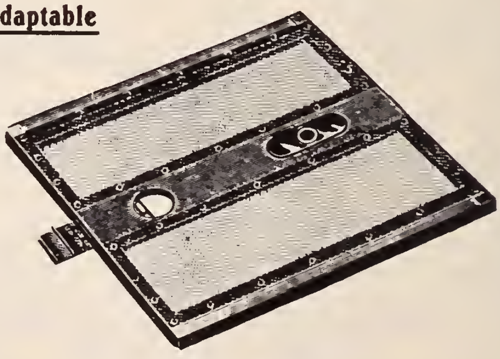

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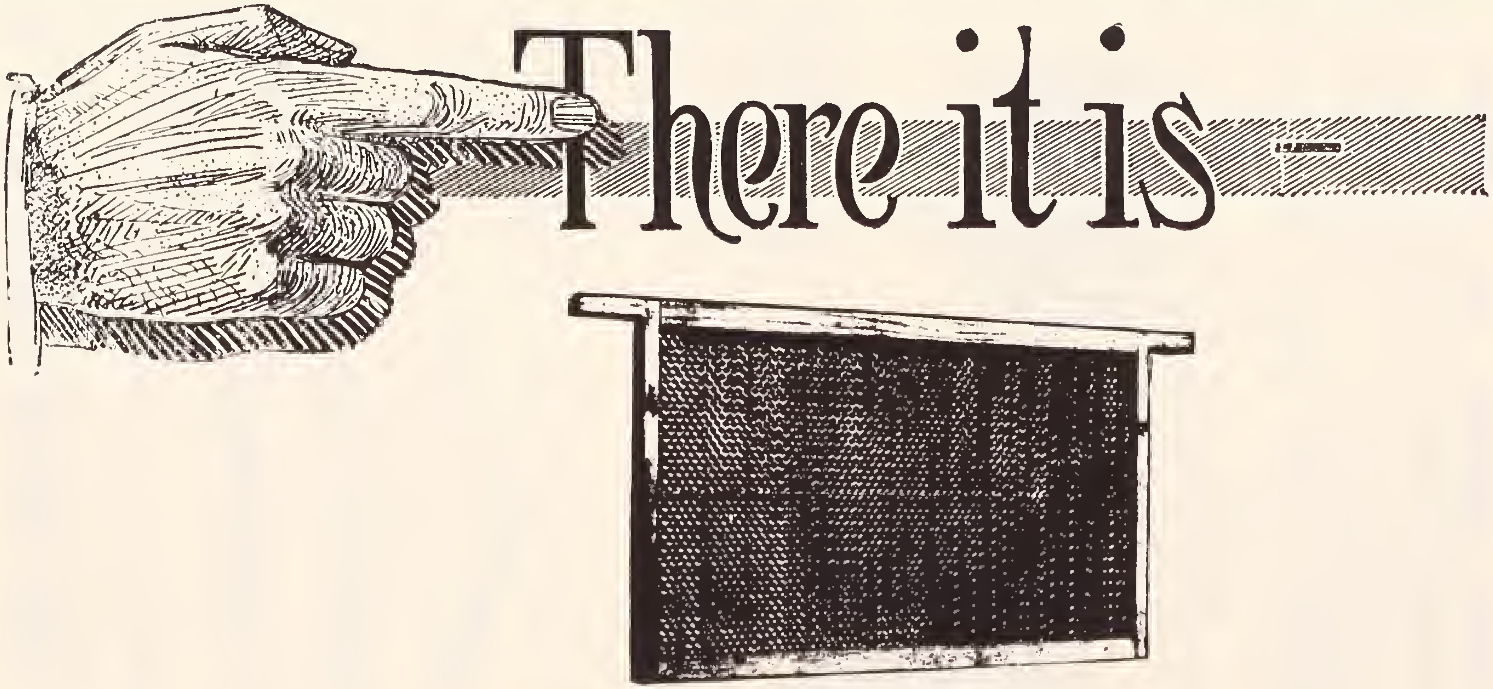

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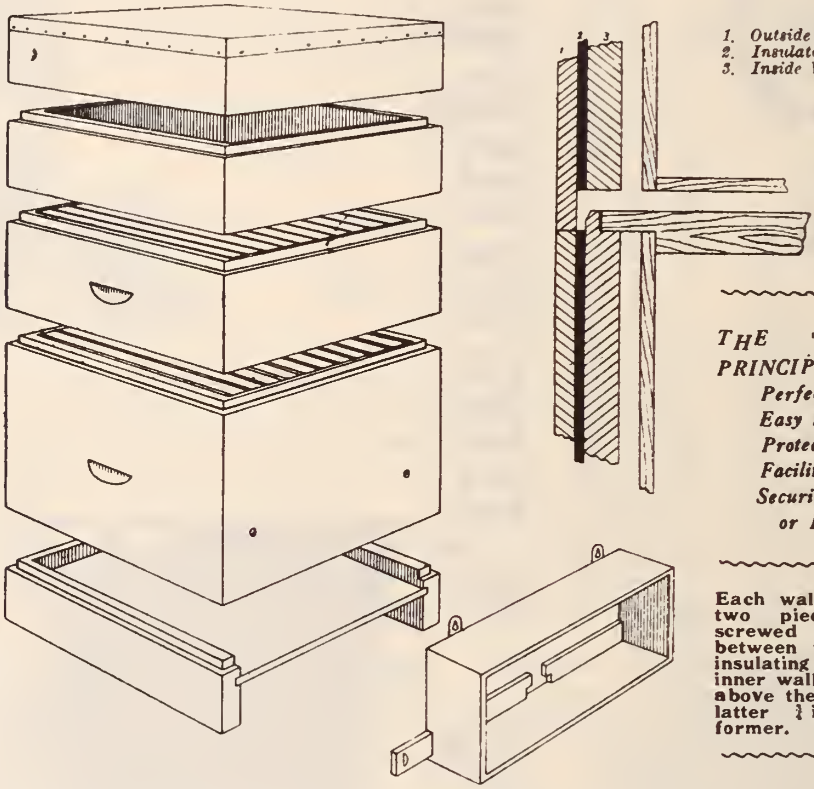
THE "HARVESTER" principle, for which a Patent has been applied for, consists in the novel construction of the walls of each chamber — DOUBLE YET SINGLE.



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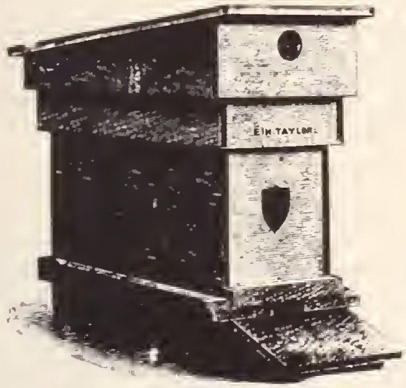

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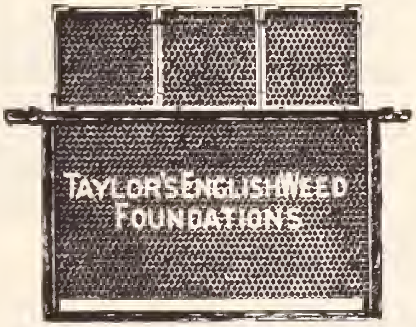

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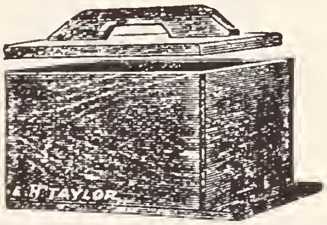

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VOL. II.—No. 12.

An International Monthly Journal devoted o the progessive interests of Modern Bee Culture.

Edited by - - A. Z. ABUSHÂDY.

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Editorial.

SPERANTO AND EEKEEPING.

An enthusiastic Esperantist and beekeeper reminds us of the desirability for an international bee paper to ropagato Esperanto among its readers, so as to facilitate nderstanding between beekeepers of different nationalities ho are not acquainted with the English language. Consider- ig the ease with which Esperanto is learnt and taught, the iggestion is both practical and admirable, and none more than irselves appreciates the value of an international language hose literature and adherents are steadily increasing. For the time being, however, our space does not permit us of following this suggestion. In future we hope to have a regular page devoted to the use of Esperanto among international beekeepers. Interested readers are referred to the *British Esperanto Association*, of 17, Hart-street London, W.C.1, who will be pleased to reply to enquiries. The Association publishes monthly the *British Esperantist*, a very useful journal which was inaugurated in 1905, and has now a good circulation.

SKEP BEE-KEEPING AND LEGISLATION.

Some critics are suggesting that a ban should be placed forthwith on skep beekeeping and that the trade in skep colonies, whether imported or otherwise, should be prohibited. Their chief reason is the danger of spreading foul brood, since it is most difficult to detect its presence in its early stages and to prevent its spread, when the bees are on immovable combs that are not sufficiently accessible for thorough inspection. They also emphasise that in Holland hundreds of colonies are taken to the moors and opportunities for the spread of infection, if present, are thus created.

So far as we know, the skep colonies imported in the United Kingdom are supplied by Dutch bee farmers who specialise in breeding, and who invite representative British bee men to examine their apiaries. They do not take part in honey production, and therefore do not practise going to the moors. The fact remains, however, that the skep is *not* a safe hygienic receptacle; and, in fact, it is doubtful that it would have reappeared on the market in numbers were it not for the present re-stocking emergency. Progressive suppliers of bees in skeps also undertake to supply them on movable combs and actually do import an appreciable number of stocks in suitable frame hives. This latter method is likely to supersede the former in future, especially after the introduction of legislation for bee diseases. At the present time, it is hardly fair to inflict hardships on a certain section of the trade and unreasonably exclude others. Legislation should do justice to all.

THE METAL COMB IN PRACTICE.

Writing to the *Australasian Beekeeper* for March, 1921, Mr. A. Shallard, of S. Woodburn, N.S.W., speaks highly of the Macdonald Comb after putting it to practical tests at the Shallard Apiaries. In the *Beekeepers' Item* for the same month we note that Mr. H. B. Parks, of San Antonio, Texas, when referring to reports of successes and disappointments, endorses our view that in most instances failures are due either to lack of knowledge of manipulation or lack of protection. Even now, in spite of the publication of sufficient educational literature, there are some beekeepers who, through habit or lack of observation, seem to entirely ignore the nature of the article and to treat it as if it were a wax comb. A correspondent, in mentioning that he is going to try the metal comb this season goes so far as to advise that he is reserving it for his weak stocks! Another does not "think" that heavy packing or the use of insulating walls is necessary. We regret to assure both correspondents that they are bound to meet with failures, for which, no doubt, the metal comb would be blamed.

In view of the rapid approach of the season in Britain, some practical notes on the use and abuse of metal combs may be helpful.

The Metal Comb in the Brood Chamber.—The successful use of metal combs in a brood chamber, especially when these are new, is chiefly depedent on: (*a*) *Uniformity* (intermixing with wax combs being undesirable, as it discourages the bees from perfecting forthwith the artificial combs to suit their requirement). (*b*) *Correct Start* (a swarm of bees—whether natural or a "shook" swarm—affords an ideal start, as it stimulates the bees to work on the combs without hesitation). (*c*) *Reasonable proportion* (as a rule a British Standard metal comb should be allocated to each pound weight of bees; and therefore no swarm weighing less than two pounds is fit to be hived on metal combs—the minimum to start with being two metal combs placed between two insulating walls, contracting the brood chamber). (*d*) *Slow Expansion* (this may be preferably left to the bees; and in any case the guiding factor (*c*) should be adhered to in carrying out any artificial expansion of the brood nest). (*e*) *Correct Manipulative Temperature.* (This should never be less than 60 deg., and preferably 65 deg. Fah., so as to prevent the chilling of the brood.) (*f*) *Good Packing.* (An appreciable number of experienced beekeepers endorse the practice of using almost the same packing in summer as in winter in order to ward off injurious heat and cold respectively, relying on widening the hive entrance and on other means of liberal ventilation, whenever necessary during exceptionally hot summer days, for keeping the hive temperature at the right degree. If such a practice is found advantageous with wax combs, we need hardly emphasise its necessity when using metal combs. As a means of side packing, detachable insulating side walls are invaluable.)

With such judicious yet simple management, metal combs have been found a phenomenal success in the careful hands of experienced beekeepers almost everywhere. Even comparative beginners should be satisfied with results if they will use these combs in an intelligent manner and will not ignore the simple and logical rules given. Success is hardly to be expected as a rightful companion for carelessness.

(2) *The Metal Comb in the Super.*—Perhaps this is the most important place where the metal comb can render the greatest economical service to the beekeeper, especially to one working for heather honey. In New Zealand and other countries, the metal comb proved successful for the extraction of dense honey to a large measure. In heather districts it should be similarly capable of rendering a good service. With a strong force of bees, good packing, and reasonable general protection, a super of metal combs should have an attracting temperature for the bees.

(3) *The Metal Comb for Queen Rearing.*—No special research bearing on this has been conducted in this country. But in America good results have been achieved. The following illustration, which we reproduce by courtesy of the Duffy-Diehl, Inc. (the proprietors of the Macdonald Metal Comb) shows what a metal comb is capable of in the hands of an experienced queen breeder. The detachability of the queen cells should be easier when these are built on a *Semicomb* as distinct from a complete comb. It is claimed in America that "queen cells reared on these combs are assured of receiving more than the usual amount of royal jelly since the bees must float the egg out to the edge of the comb in order to build the queen cell." We shall endeavour to verify this statement from actual observations. But we can endorse with clear conscience the assertion that "the use of this comb is the best insurance for proper mating, as it is next to impossible to raise drones in aluminium worker comb. The queen breeder can and should provide drone comb for a number of his best colonies and thus flood his apiary with high class drones." We hope to publish additional practical notes in following numbers.

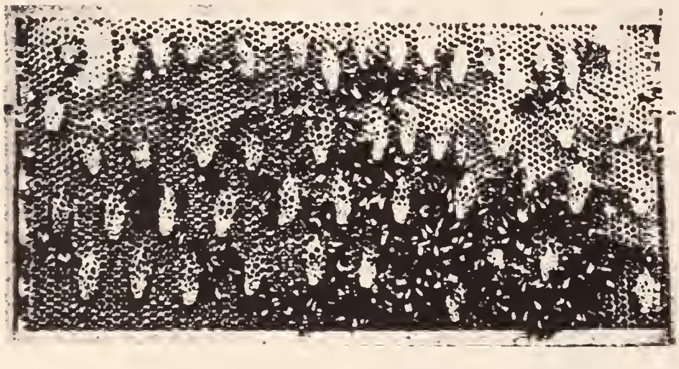


Fig. 54.—A Metal Comb in Use for Queen-Rearing.

Original Contributions.

Originality is the one thing which unoriginal minds cannot feel the use of.—J. S. Mill.

Notes on Acarine Disease.—I.

By JOHN RENNIE, D.Sc., F.R.S.E.

How Infection Takes Place.

In Acarine disease the thoracic breathing tubes of the bee are infested with numerous mites which pass through the whole of their growth stages from egg to adult within the body of the bee. All types of adult bees are liable to be affected—worker, drone and queen. The mites both feed and breathe in the situation indicated and the result of their secure establishment in this situation is a progressive weakness affecting the whole body. This is primarily due to a continuous loss of blood resulting from the feeding of the mites. The blocking of the air tubes restricting the supply of oxygen, and causing a deterioration of various tissues directly connected with these varies considerably and is of the nature of a secondary complication. Weakened bees continue working sometimes for a long time, but eventually they become unable to fly and cease to share in the co-operative activity of the colony. They thus become not only useless members, but a burden upon their fellows in the hive. Further, this is not all, for while such bees—popularly termed "crawlers"— remain associated with the stock they are a continual source of danger to the healthy brood of bees which are successively emerging from the cells. Crawlers, more particularly while within the hive, are in point of fact the most important menace as regards this disease to healthy bees that exist.

Infection takes place in the following way:—

As the mites bred within the bee increase in number and attain maturity, they pass to the outside of the bee, where by suitable methods of examination they may be found creeping amongst or clinging to the hairy covering. So far as we have been able to find out only the adult female migrates effectively in this way. When bees carrying such mites upon their body move about in the cluster—rubbing shoulders, as it were, with their healthy fellows—the mites are transferred from bee to bee. When this has happened, the adult females instinctively find their way to one or other of the first pair of thoracic air openings, which they enter. Fertilisation has taken place previously in the bee, from which the mite migrated, and on the arrival in the new bee-host, egg-laying commences very usually, but not invariably, near the entrance to the tube. In due course, brood in all stages, from eggs to adults, are to be encountered right along the tracheal system of this part of the body as far as the diameter of the tube will permit the mites to pass. Fully developed mites pair within the bee and after fertilisation migration takes place, although it seems to be the case that certain broods do not migrate, but lay eggs within the bee in which they themselves were bred.

It has been clearly established that bees infested with mites continue for a time to forage. They can fly, gather pollen and nectar, and carry out the usual routine of a mature bee. Whilst they are doing this, *e.g.*, visiting flowers, they are carrying mites upon the exterior of their body, some of which are doubtless shed upon the blossoms they visit, perhaps to be picked up by other chance visitors to the same flower.

A very large number of examinations of dead bees infested during life with this particular mite, *Tarsonemus woodi*, have been made, and all the evidence obtained has gone to show that the period of survival of the parasite under such circumstances is comparatively brief. It is usually possible, even upon very old bees which may also have become dry and brittle, to demonstrate an infection by the pathologically chitinised condition of the remains of the tracheal system, and sometimes by the presence of dead mites, but I have not been able to find living examples in such bees. Consequently, I do not think that such bees are likely to be dangerous to healthy bees from the point of view of agents of infection with *Acarine disease*. There is a possibility that the eggs left in the tracheæ of dead mites are capable of prolonged survival, but little probability of their transference into the tracheæ of the living bee!

The whole of the earlier experimental investigations which I carried out with other workers, in which healthy bees were placed in hives previously occupied by infected bees, yielded negative results as regards infection, and later, I have failed to find living *Tarsonemus woodi* on frames or other parts of hives apart from the living bee. The evidence on the whole points strongly to this disease being almost entirely a *contagious* one carried by the living bee.

Periodicity of Crawling Symptoms in Acarine Disease.

It is a matter of common observation, more particularly in summer, that there are intermittent periods of crawling in *Acarine disease*. Many claims of cure or recovery have been made upon this simple fact, to be recanted later. This feature is readily understood when we realise that an excessive amount of crawling, such as is seen to occur frequently on very warm days, rids the hive of the great bulk of individuals in the advanced stages of infection and in this way lowers the proportion of infected individuals in the bee population. Whilst this is going on new bees are being produced in large numbers, and even although a proportion of them may become infected quite early in their adult life, they continue to fly and work for a considerable period. There is little doubt that this is so. Thus a false impression of recovery from the disease is conveyed. During this period crawling may be virtually absent, and even when it commences again, the proportion may be a low one, because owing to the previous loss of infected bees, the opportunities meantime for infection have been more limited. But all the time there may be a rising proportion of infected bees.

These facts explain those cases where a stock which has been reduced by crawling losses when strengthened by fresh bees, makes a good, though in most cases only temporary, recovery. But such a recovery may be effected at a critical time by fostering breeding by the queen and providing foraging bees whilst the nectar flow is at its height.

The Queen in Relation to the Disease.

The saving of the queen of an *Acarine* affected stock is a procedure which is not to be recommended. I have found that nearly 50 per cent. of queens heading *Acarine* infected stock, are themselves affected with the parasite.

The dangers from an infected queen are two-fold: The queen does not usually succumb to the disease during the life of the colony, and if infected early she therefore remains a centre of dissemination of the parasite over a prolonged period. Secondly she is in a progressively weakened condition which directly affects both the rate of her production of bees and probably also the stamina of her brood.

Robbers.

Regarding means of infection, there appears to be no question that robbing plays a very important part. This procedure usually consists in an attack upon a weak stock by bees from a relatively strong one. The weak stock may be a diseased one; it very often is so, and robbers attacking such a stock inevitably come into contact with infected bees and doubtless in so doing carry away to their own hives parasites on their bodies. Further, in robbing under such circumstances there is a mingling of bees from different stocks, amongst which there is always the possibility of the presence of a proportion of infective bees, so that even although the weak stock under attack is free from disease, the situation is one in which the danger of dispersal of the parasite amongst many stocks is quite real. Beekeepers should apply themselves to devise more effective measures against this practice than appears to exist at present.

Counties in England in which Acarine Disease has been identified in the months of January and February, 1921.

Kent, Surrey, Hertfordshire, Berkshire, Devon, Norfolk, Leicestershire, Huntingdon, Stafford, Monmouth, Derby, Cheshire, Westmorland, Durham, Sussex, Hampshire, Oxfordshire, Dorset, Somerset, Warwickshire, Rutlandshire, Bedford, Gloucester, Denbigh, Lancashire, Yorkshire Northumberland.

The Importance of Requeening Often.

By E. R. ROOT.

Editor, "Gleanings in Bee Culture."

Author, "Bee Diseases," "Feeds and Feeding," "Wintering Bees," &c. Joint-Editor, "The A.B.C. & X.Y.Z. of Bee Culture."

In semi-tropical sections, the bees may breed more or less every month in the year. Where this is the case, queens are often worn out by the end of the first year. In more northern sections, where the bees breed heavily from March up until June and July, the queens are inclined to stop laying after the main honey flow. Nature seems to demand a rest; and sometimes after a very heavy honey flow a queen is so severely worked that by the approach of another breeding season she gives out just when she is needed the most. The result is, brood rearing is greatly curtailed, or supersedure takes place. Unless the beekeeper steps in at the opportune moment, there is quite likely to be a loss of two weeks' time or more between the demise of the old queen and the new one, resulting in a very material reduction of the force of bees needed to catch the crop later on.

It was the late Dr. C. C. Miller, a lifelong department editor of *Gleanings in Bee Culture*, who said he had no definite rule about requeening. He simply requeened whenever a colony needed it. What he could do with his long experience, others could not or do not do. It is getting to be more and more the practice on the part of the best producers in the country to requeen every year. Of course, where a queen has made a remarkably good record, she should be kept over for breeding purposes the following season, but men who are making crops by the five, ten, and fifty tons are finding it a good rule to requeen at least once a year. While the practice is not universal among all the large producers, it is much more common than it once was. Formerly good beekeepers believed that a colony needed requeening only once in two years; and in many localities with many beekeepers the practice was productive of good results. How much more honey could be secured by requeening every year cannot be told, but a queen more than a year old is liable to fail at a very inopportune time, perhaps causing a loss in earning power many times the cost of a new one.

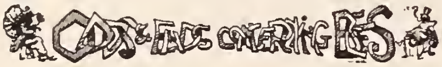
Quoting Dr. Miller again, he said that he noticed that after a heavy honey year there would be more supersedures the following spring than when the crop has been light or even a failure. If that is true, one possibly, after a light year, could afford to eliminate requeening, but after a heavy year it would seem to be good business to requeen the previous fall and thus secure a large force of young bees that would be reared that fall. It is a well-known fact that old queens do not breed as readily in the fall as young; and a good force of young bees is a very much better asset in the winter than old ones. To go without requeening after a heavy year increases the liability of many colonies to supersede their queen the following spring than when the crop has been light or even and unless he has queens ready at hand, he is likely to have a loss of two weeks' brood-rearing that may mean a material reduction in his crop of honey. It should be remembered that it is often difficult to get queens in the spring. They are high-priced at that time: whereas if the queens are secured in late summer or early fall they are obtainable in any quantity and at the lowest price. A young queen, as already pointed out, will mean fall breeding provided the conditions are not unfavourable, and a force of young bees for winter.

In the Southland, and particularly in many places in California, I have thought that perhaps some beekeepers could afford to requeen twice a year. I have looked into a good many hives in California, and saw what I thought were prematurely worn-out queens—queens that lay every month in the year. Then in early spring, when breeding ought to be heavy, the queens fail. There is either but very little brood or else supersedure. The early honey flow comes from orange blossom in southern California. Unless the colonies are strong at the time the crop will be lost.

There is one more factor, and that is the quality of the queens in the first place. If one buys the very best stock, raised by the best methods by men who have built up a reputation, he will not have to requeen as often as if he bought cheap stock raised on the haphazard methods. It is penny wise and pound foolish to economise in the cost of queens. A poor queen might save a few cents in first cost, but cause a loss to the colony of many dollars.

It would ill behoove me to lay down any hard-and-fast rules about requeening. If one is a Dr. Miller, he can, perhaps, requeen when the bees need it; but even then he will run the risk of having supersedures take place in the spring when he cannot get queens.

I have tried to lay before you certain general conditions; and whether you shall requeen every six months, once a year, or every two years, will depend on conditions. Your locality, the number and strength of your honey-flows, your climatic conditions, are all factors that you will have to consider.



By R. WHYTE.

HOW THE QUEEN WAS RECEIVED.

In July last I sent a fertile queen to Dr. Hamilton, Chichester, who sent me some interesting notes regarding her acceptance. ". . . Using a *B.H.C.* with a temporary glass cover I was able to observe the mother's reception by the queenless (artificial) stock. This occupied half an hour from the time I admitted the workers; these latter went through a wonderful ritual, appearing to stroke her with antennæ and tongues (one bee, however, endeavoured to drag her by a wing towards the opening down to the combs, but did no harm), a part of the time they stood all heads towards her, many standing on each other's shoulders, as it were, and doing what was necessary. But of quickly running down amongst the combs there was none. (The sentinel bees this evening seemed very much alert in this hive.) The whole process reminded me of ostlers rubbing down a racehorse. But even the bees appearing in the opening were in serried ranks, all heads towards her—these fed her, I think. . . . It struck me that the *B.H.C.* made a most favourable means of observing details closely—unlike most methods of requeening."

PAINTING HIVES—DOES IT PAY?

At the best of times it has always been a moot point whether it paid one to paint hives. There will be little question that it does *not* pay at the present price of material. The beekeeper has long since abandoned the painting of wooden roofs as a means of keeping his hives rainproof. The only effective way in using paint for roofs is to lay calico on the roof of his hive and coat thick paint on top of this. Even this is being abandoned in favour of felt or *ruberoid* covering of roofs. Felt I use on all my hive roofs.

Instead of paint I use a wood preservative. Floors—top and bottom, bodies and brood boxes, *inside* and out. As these preservatives can be got in a range of shades one can use various colours. Personally, I use a light brown. The preservative I use is "*Solignum*." I find it enters the wood readily and a few days in the sun dissipate all smell. I coat my hives *inside* one coat, and outside two coats. In appearance this preservative is rather pleasing to the eye, as the grain of the wood shows through it. With paint one cannot coat the inside of hives, as this would render them non-absorbent. With one coat of "Solignum" the inside walls are quite absorbent to moisture as the preservative has gone in. As there is a slight oiliness in this preparation I find two outside coats shed the rain nicely.

All the creepy things that shelter about the corners of a hive do not like these preservatives, and one's hives keep sweeter and less messy than before. As to cost; the cost isn't a fourth of the price of good paint, and one can coat three or four hives with "*Solignum*" in the time one could be coated with paint. There is no blistering or peeling off, and once in use a coat outside every season is easily done. Another thing: If one tires of the preservative, paint can be applied on top of it just as easily as on untreated wood.

[We endorse Mr. Whyte's last statement, provided the original stain is thoroughly dry and afterwards sized. In any case three or four coats of paint will entirely mask it when a change is required.—Ed.]

CARBOLIC SUBDUER.

As the time is now on when periodic examinations of stocks is necessary, I should like to draw attention to an improvement on the usual Carbolic Cloth. The usual "No. 5 Carbolic" sprinkled over calico is objectionable in many ways. Coming in contact with the skin it discolours and kills the outer layer or epidermis. It is also apt to taint anything it comes in contact with. Try this: Get ½ oz. carbolic acid *crystals* and 1 oz. camphor. Break the camphor in small pieces and put all into a 2 oz. bottle. Very soon, with shaking, the whole will run liquid. Sprinkle a little of this over your cloth and you will find it very effective as a subduer and *not* at all offensive. To me it has rather a pleasing odour. A little of this mixed with salad oil applied to the hands and wrists apparently helps to prevent stings. Dip a rag into this mixture and smear lightly over any exposed parts. Keep the rag and also the subduing cloth in an air-tight tin and this will save renewing, except occasionally.

REQUEENING VERSUS SUPERSEDURE.

I would like to impress on beekeepers the absolute folly of requeening every year. It was the outcome of ripe experience that led Dr. Miller to say that he left it to the bees to supersede their queen, when, in *their* judgment, it should be done, and he added: "I generally find my confidence well placed." It does not follow by any means that any *scrub* queen should be left in a colony. See to it that your queen and her progeny are in every way satisfactory.

If one keeps a sharp look out we will find that fully three-fourths of superseded queens are replaced by the bees immediately after the main honey flow. To those who think requeening their stocks necessary, I will outline a safe and satisfactory method. Rear a lot of cells at the time mentioned above from your *best queen*, and 24 to 48 hours before they are timed to emerge, give one of these cells to each colony you think might, with advantage, be requeened. Place this cell anywhere that the bees can cluster round it, using a cell protector. *Don't* hunt out the reigning queen at all. If the bees have any notion to supersede their queen they will accept this young one and destroy the old queen. If they destroy the *young* one, just allow the old queen to remain, as almost invariably when the bees decide on keeping their old queen I find she proves quite all right for another season at least, when the same procedure can be gone through. This is an eminently satisfactory method to follow, and does not cost much labour.

The Production of Heather Honey.

By JOSEPH PRICE, B.B.K.A.

Expert and Lecturer in Beekeeping, Staffordshire County Council.

I think it probable that many beekeepers are not interested in this subject for two reasons. In the first place they may reside so far away from the moors as not to see any great advantage in the knowledge of how to produce it, and secondly, there may be some who think that the production of heather honey is an easy business which anyone can manage, especially seeing that the heather blooms so late in the season and at a time when bees, of their own account, will be strong enough to take advantage of this crop.

They may also contend that all their energy and skill in management is required to secure the earlier harvests and to get the bees strong enough to take advantage of these flows, and therefore there is no need for anything special for the late crops.

This is a grave error, and while I admit that bees will help themselves as far as they can, securing surplus is another matter requiring great skill and management from their owner.

Let us now consider some of the *methods in common use.* In some districts it is a common practice to dump swarms and casts into all kinds of receptacles, and the bees are allowed to build as much comb as they can during the summer, in preparation for the heather season. At the proper time these are carted to the moors and later on brought home again. The bulk of them are then driven and the bees united to the remaining stocks, in many cases without any attempt to prevent fighting. The consequence is usually a great slaughter of bees and inevitably many queenless stocks in the spring.

This, of course, is a system that should be abolished, and is really worse than the older method of smothering the bees. The usual method of preparation for heather time is to crowd the bees on to eight or nine standard combs, and then super sparingly; often considerable success is attained by having the bees housed on 10 shallow combs. But in any case, it is necessary and important to have all brood combs *filled* with something, the best, of course, being brood.

To secure this state of affairs *it is advisable most seasons to feed gently from the close of the clover season to the commencement of the heather.*

Apart from this it is also wise to observe *three points of importance; i.e.,* (*a*) That it is unnatural for bees to build comb at this season; (*b*) The days are shorter, nights longer, and consequently colder; (*c*) That it is a mistake to expect the same queen to go through the two harvests and give satisfaction.

Therefore the beekeeper must remedy these things by, first, providing as many drawn-out combs as possible for the supers. Secondly, bees must be wrapped up with plenty of warm coverings when at the moors, to enable them to preserve all the heat possible. Last, but not least, young vigorous queens should be introduced just before carting to the moors.

Again, there are many *dangers to be faced in carting* to and from the moors; usually the hive walls are bad, and while motor transport relieves this grievance considerably proper ventilated hives must be provided to avoid suffocation. The owner will be wise to fasten the frames so that they will not wobble. Many queens are killed *en route* to the moors by careless packing, and the young ones raised to replace the loss often fail to mate at so late a period of the year.

The greatest danger of all is from *disease.* This was recognised by all followers of the moors in former days when "Foul Brood" was more prevalent, but this danger has been accelerated tenfold since the advent of *Acarine disease.* One diseased colony at the moors becomes an easy prey to dozens of other stocks, who become tainted and spread the infection in their different neighbourhoods after they are taken home. From the above it will be seen that great skill, good methods and system are required to obtain success in production of heather honey.

Whilst there are many dangers to be faced and many risks run, these are often compensated by the delightful trips to the moors among splendid company to see how the bees are progressing: and though a second harvest is not always secured, the memory of these expeditions makes sweet reflection during the winter season by the fire-sides.

I cannot finish without a word about *Heather Honey.* This honey (ling) cannot be extracted, but must be pressed from the wax comb, the best method being to secure it in sections. Heather honey, when absolutely *pure,* will not granulate, but retains its gelatinous nature for a long time. However, in most seasons there are in bloom on or close to the moors, blackberry and gorse. Consequently the honey from these sources, in however small quantities, granulates and can easily be seen. Many people believe that heather honey is dark or nearly black. This is a mistake, as *most heather honey is never darker than a deep amber,* and while it is said to be necessary to cultivate a palate to relish it, personally I think it is the best of all honey.

The Production of Regenerate Queens.

By ARTHUR M. STURGES, B.Sc.

Vice-President, Cheshire B.K.A.

"The mother queen is the life centre of the colony," and the success or otherwise of this colony depends in very great measure on the quality of the queen. No pains, therefore, should be spared to obtain the best it is possible to produce.

The importance of strain appears to be generally recognised, but in many cases, little care is taken in the actual rearing of the queens, though this is probably of more importance than the selection of a strain, as a poor queen of the finest strain is worthless, whilst a properly reared queen of slightly inferior strain will produce quite reasonable results.

Though good queens can be reared in large numbers by any of the well-known methods, the production of the *best* requires the greatest care throughout the whole development, from the egg until the laying queen is safely introduced to the stock in which she is to operate. If this fact were more generally recognised a great advance would be made in the fight against *Acarine disease* and other infections.

SELECTION OF STRAIN.

In the selection of a strain the first consideration *must be temper,* as unless gentleness is assured, the modern methods of management, involving frequent manipulation, cannot be carried out with any degree of comfort. As many Italian and American strains, notably those of Penna, J. M. Davis, and Jay Smith, combine this with good working qualities, there should be no difficulty in making a selection.

The strain chosen must be vigorous and prolific, in order to combat disease and build up the strong stocks necessary for honey production. Colour should be a secondary consideration, though it is naturally advisable to produce handsome bees, providing the other, and more important qualities, do not suffer by doing so.

As under natural conditions, where the bees swarm every season, the queens are the progeny of young queens, this should be adopted in the modern methods, as the experience of several years has shown that the finest queens are those produced from *young* queens which are laying in small stocks.

During 1920, attempts were made to breed from an exceptionally fine queen working in a brood nest consisting of 10 frames, 14 x 14, and 10 frames standard size, with bees working these in addition to two shallow frame supers.

The result was a failure, as though many handsome queens were obtained, only one approached the high standard required, and the workers from this are short lived and will probably not survive the winter.

A young queen of a good strain should therefore be selected for size, temper, colour, and laying capacity in a small nucleus, and used for providing the eggs required for queen raising.

This queen may be tested afterwards in a strong stock, during the next season, and if found satisfactory her progeny may be utilised in the formation of a strain.

The breeding queen should be kept in a 3 or 4 frame nucleus, which should be fed unless a good honey flow is in progress.

LARVAE FOR GRAFTING.

When larvae are required for grafting the comb containing those of the required size may be taken to the grafting house. It is far more convenient, however, to cut out a small portion of comb, *e.g.,* 1in. x 1¼in., as this is more easily handled, and causes less commotion in the nucleus, than is the case where bees have to be shaken from the comb. The damage will be made good with new worker comb in a few days.

The small piece is shaved down to within ⅛in. of the foundation to facilitate removal of the larvae.

The actual grafting process is carried out as generally described in queen-rearing manuals, the smallest possible larvae being chosen for the purpose, these being probably less than 12 hours old.

The queens produced from these very small larvae will emerge at from 11½ to 12 days after grafting.

STARTING THE CELLS

Where a large number of queens are to be reared, it is better to put aside two stocks for the work; one as a starting colony, the other being used for finishing the cells.

Though the starting colony may be a queenless stock on 7 or 8 frames, this must be kept supplied with sealed brood, otherwise the bees dwindle rapidly.

If really fine queens are to be raised, cells must be finished in a very strong queen-right colony, under one of the natural queen raising impulses. The bees in this colony *must* consist largely of young bees, *which are absolutely necessary for the production of the finest queens.*

The cups containing the grafted larvae are placed in the starting colony, which has been made queenless two or three days previously.

This must be gently fed at the time of giving the cells, or usually a low percentage of these are accepted. When conditions are right it is not unusual to have 20 to 22 cups accepted out of 25.

The started cells are not allowed to remain in this colony for above 18 hours, but should be transferred to the finishing colony.

FINISHING THE CELLS.

The cell-finishing colony must be very strong indeed, consisting largely of young bees, and containing a large amount of sealed and emerging brood. As a very strong stock under the swarming impulse is so difficult to control, it is advisable to use this under the supersedure impulse.

Very good results have been obtained with the *Insulator Hive* fitted with three standard brood boxes containing sufficient bees to cover all the frames, and headed by a really good queen. If necessary this stock can be strengthened by the addition of emerging brood from other hives, but this is not required where the stock has wintered well.

By means of a wire queen excluder, the queen is confined in the lower brood box, kept supplied with empty combs and combs of emerging brood, and food.

In the brood box above the excluder is placed all the unsealed brood, together with several combs of capped brood. This box should not be filled, sufficient room being allowed for four or five bars of queen cells.

The top box should contain the honey combs and any surplus combs of eggs and larvae.

Every week this stock is examined, and combs containing eggs and larvae transferred from the bottom brood box, these being replaced by empty combs or combs of emerging brood from above.

During 1920 a stock as described produced more than 90 very fine queens in a period of 45 days, the queen keeping the hive supplied with 20 to 25 combs of eggs and brood during the whole of this time, without any natural queen cells being formed.

At the close of the season the queen in this stock must be replaced, as the work entailed by the use of this method renders her useless for further work.

The started cells are placed in the middle brood box between combs of well advanced sealed brood.

Unless a good honey flow is in progress, the stock requires fairly rapid feeding, using, for convenience, an Adminson or an ordinary dummy feeder, if the cells are to be attended to in the best possible manner.

Though a stock of the strength described could probably deal with 20 queen cells at one time, and rear good queens from these, the number should be limited to 10 cells if only started, or 15 in all stages of development until sealed if the very finest queens are desired, as it is of great importance to ensure all cells being amply provided with food.

After the cells have been in the colony two days they should be examined, and all those rejected which have not been well supplied.

The cells should be left in this stock as long as possible, and transferred to nuclei a few hours before the queens emerge. Though the use of cell protectors is often advised, these have not been found necessary.

It is not advisable to hatch the queens in cages, though this is essential where virgins are distributed. In this case the cage should contain 6 or 8 young bees, so that the emerging queens can be cleaned and fed.

The cells from which the queens emerge should be examined and should contain an excess of royal jelly. Unless this is formed the queen should be destroyed, as it is doubtful whether she will be up to the standard.

MATING THE QUEENS.

When a large number of queens are reared the use of small nuclei is essential, and baby nuclei, containing frames 7in. x 7in., are very convenient. These can be united, if required, at the end of the season, but are useful for wintering queens, and are used for this purpose—queens having passed through the recent winters with safety on four or five of these frames.

The experience of 1920 was that queens in these very small nuclei were mated, in most cases, very much earlier than those in larger stocks.

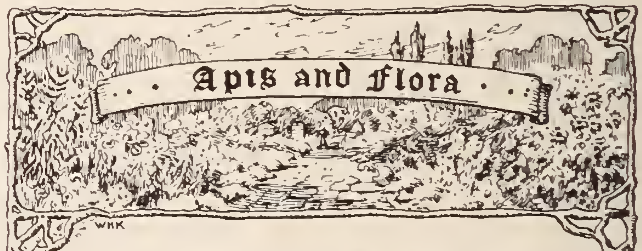
In spite of the abnormally bad weather during the past summer, *no difficulty in my apiary has been found in queen mating*, until late in August, when the drones were being expelled from the hives.

Up to this time there had been no cases of queens lost in mating, or of drone layers, except in the case mentioned of those raised from a queen in a very strong stock.

The probable reason for this was the abundance of drones produced by placing drone comb in the stocks selected for this. The apiary was well supplied with drones from these—all others being trapped.

It was found that queens became mated very near to their hives, and were frequently observed being followed by drones to and from their hives.† In one case mating was observed to take place within 8 feet of the ground, contrary to the usually accepted statement.

By gentle feeding in the morning the young queens can usually be induced to fly during the afternoon, and this procedure has frequently resulted in very early mating.



Even bees, the little alms-men of spring bowers,
Know there is richest juice in poison-flowers.
—KEATS.

Jottings.

By A. F. HARWOOD.

A suggestion that I would make to the bee-gardener is that he, or rather she, for I find ladies more interested in the planning of displays of bee flora than are the men folk, should treat some of the quite hardy annuals as biennials; that is, instead of sowing in spring, do so in *early autumn.* The resultant plants are in every way stronger, larger and, this the most important consideration, *earlier flowering*. On reflection it will be recognised that this is the *natural* method, such plants self-seeding in autumn and reproducing themselves freely. *Limnanthes Douglassii*, than which I know few more useful bee plants, is a profuse self-seeder.

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† Practical and scientific notes on the recent research on *selective mating* will be found in the BEE WORLD, Vol. I., p. 62, and Vol. II., p. 74; also in the *Beekeeper's Record*, May, 1920, p. 57.

The perennial *Aster or Michaelmas Daisy*, is a plant often proscribed on account of its spreading, pervasive root system. Many of the newer varieties, less prone to subterranean excursion, are great advances on the type and, whether in single clumps or self beds, are conspicuously beautiful. All shades are now obtainable, from pure white, through pink and lavender, to deep purple. An admirable border companion to *Aster* is *Heliotrope*. This latter, where there is glass for its winter protection, can be grown on as standards and bedded out either in or from pots. Hive bees work these freely *in St. James's Park*. A plant worthy of far more attention than it receives at present is the "French Honeysuckle," *Hedysarum Coronarium*. Far more like a giant sainfoin than honeysuckle in habit and appearance, it is a very strong grower, indifferent to site or aspect, and highly attractive to the foraging bee.

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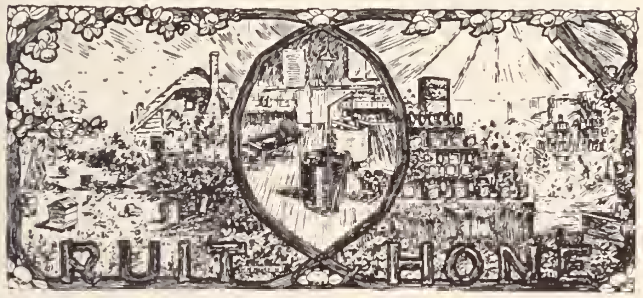

The Bee's Role in Fruit Culture.

By J. ROBERTSON,

Director, Messrs. Steele and Brodie, Wormit, Scotland.

There is a tendency to regard the bee from the honey producing standpoint solely, neglecting the fertilisation of our wild and garden fruits and flowers. Let us look to this later question, suggesting that if this feature was oftener impressed on the general public, we might in many instances receive more toleration from them when our winged friends are giving some annoyance.

Some notion of the sexes of plants appear to have been entertained by observers for many centuries; but it is only of comparatively recent date the matter has been put beyond dispute. Herodotus mentions that the palm growers distinguished between the trees that bore fruit and those which bore only flowers and they found it necessary to bring the flowers in contact to produce the fruit. But it was not until the later part of the seventeenth century that the phenomenon of vegetable fertilisation was cleared up. Grew pointed out at a *Royal Society* meeting that the pollen dust fertilised the seed vessel. Darwin first made clear the importance of insects carrying the pollen from one flower to the female organ of another flower. His summing up is: "Cross fertilisation is beneficial. Self fertilisation is injurious." Most plants have a flower of some kind or another, intended for fertilisation. The process runs much in the same lines for all. Some plants have the organs of generation on separate flowers, some on the same flower. The process is called *Pollination*. The male element is termed the *pollen* and consists of small minute bodies, to the naked eye, a dust, but each grain contains a life germ. These grow within the anthers or male organ, which bursts open when ripe. The *stigma* is the female organ, and on to this the pollen dust has to be conveyed. When this occurs Pollination has taken place. *Our bees are very active agents in this work*. Both organs in the flower must be ripe. When the stigma or female organ is moist the pollen grain readily adheres. Encouraged by the moisture, the pollen grain bursts and shoots a long hair-like filliment down the stalk into the ovary of the flower, within which are the ovules. When maturity is reached the ovules become the seeds, the ovary the fruit. Thus we have a fusing of male and female contents. Now besides this combination of organs we have some plants secreting *nectar*. This nectar is not a bye-product, but has a purpose, "the attraction of the insects." It was a long time before the function of nectar was understood by botanists. Patrick Blair thought that honey absorbed the pollen and then fertilised the ovary. Pontedera contended that it kept the ovary moist. Linnaeus gave up the solution altogether. Krunitz thought that he observed in meadows much frequented by bees, the plants were most healthy but the inference he drew was that the benefits derived from the bees' visits was, they removed the nectar which was injurious to the plants. Kurr and Rothes observed that the secretion of nectar in flowers is intimately associated with the maturity of the *stamens* and *pistil* and laid it down as a general rule that it seldom commences before the opening of the *anthers*, is more copious during their maturity, and ceases as soon as they wither. But neither found the secret. Sprengel first pointed out that nectar is to attract the bees and other insects. Honey is the attraction. The bright tints and marking of the petals form the guide. When the flower is fertilised it withers, its function is gone.

J. ROBERTSON, ESQ.

Lord Avebury, by an interesting experiment, found out, by the substitution of different colours, that the bee has an eye to colours. This instinct is valuable in the fertilising of our flowers. Our bees, therefore, visit the flora for two reasons, then. They search for pollen and honey, pollen and honey to feed the young, honey for their own immediate use and to store for seasons of dearth. We make use of their hoarding instinct and secure our surplus. When the bees visit the flowers for the honey they carry the pollen from flower to flower and unconsciously dust them on the female organs. It is evident, then, that successful fruit-growing is to a great extent dependent on bee visitation and is in many districts the greatest and most important use of the bee.

Further, run over our grand store-house of poetry and cut out all reference to the flowers that deck our fields, glens and woods, and see how dull and unresponsive our literature would be. Just take these verses from one of our minor poets and this is only at random. Note the setting inspired by the gems:—

"Hail, beauteous stranger of the grove
  Sweet messenger of Spring.
Now heaven repairs thy rural seat
  And woods thy welcome sing.

What time the daisy decks the green
  Thy certain voice we hear,
Hast thou a star to guide thy path
  Or mark the rolling year?

Delightful visitant! with thee
  I hail the time of flowers,
And hear the sound of music sweet
  From birds among the bowers."

Here we have this little insignificant insect doing three great works for us: fertilising our flowers, and fruit blossoms, gathering honey from nature's abundant storehouse, and providing material to brighten our landscape and adorn our beautiful poetry.

We must all admit that this would be a very bare world indeed if it were not for our fruits and flowers; and even though we cannot all have a look into the wonderful mechanism of these, as we see them growing on the roadside, yet we can all admire their beauty. Even the modest wayside flower, which we may think is "born to blush unseen and waste its sweetness on the desert air," is visited by countless insects who, in pilfering their sweets, contribute to their fertility.

Proceedings of Associations and Clubs.

Society lives by faith, and develops by science.—AMIEL.

The Beekeepers' Association of British Columbia and Canadian Bee Culture.

By JOHN BROOKS, Vancouver, B.C.

The *Beekeepers' Association of British Columbia* are planning a big educational campaign for the coming summer. It has long been recognised that ignorance is the stumbling block upon which any legislation for the craft falls down. All the inspection work which it is possible to give counts for nought when the beekeeper persists in keeping his stocks on the let alone plan.

The summer course will be carried out at the experimental apiary of the organisation, and those wishing to attend will be instructed in the elementary principles of beekeeping with the most modern equipment. Field meetings are also being arranged to take care of the members living in the remote country districts.

The wintering problem in British Columbia is always an evergreen, and experiments are being carried out more or less every season. There is, however, one point that all are agreed upon, and that is that it is impossible to have bees too warm during winter. In this *damp* climate, where 57 inches of rain fall during the year, the big problem is keeping the hives *dry*. The sealed cover is not a success as there is too much condensation that takes place; and if there is not sufficient ventilation to get rid of this super-abundance of moisture, the colony suffers.

The packing over the brood nest should be composed of some very absorbent material, such as old sacks, leaves or planer shavings, and should on no account touch the cover inside, as this contact starts condensation. If the combs outside the cluster are found to be mouldy on examination in the spring, the ventilation has been poor and steps should be taken to rectify the trouble. All these remarks apply only to the coast regions, as in the interior a totally different climate obtains.

"*Shall we Stimulate our Colonies by Spring Feeding*" formed quite an interesting lecture given recently before our Beekeepers' Association, and the arguments for and against were many and varied. The champions of spring feeding brought forward many points in its favour, amongst them being that bees are loath to break into capped stores at any time, and during the early breeding period this condition is very detrimental to having a large force of bees ready for the harvest. But by supplying them with something that will give them an incentive to breed such as this imitation honey flow, the whole colony is made to feel prosperous and the work goes on with a vim.

The opponents to spring feeding were of the impression that it is the worst thing that can happen to a colony to be rushed ahead at such a critical time, as the weather is by no means settled, and should the brood nest be enlarged, which is often the case when feeding in the spring, and the weather turn cool, all that has been gained will be lost and the *morale* of the colony affected. Lots of stores in the fall and a young queen will do all the stimulating necessary was the parting shot of those in favour of letting nature take its course in early brood rearing.

A bee inspector permitted a colony of bees to be removed from one district to another. On the bees arriving at the end of their journey a report came back that the colony was suffering from *Foul Brood* and was badly infected. The official who permitted the bees to be removed swears that when examined by him they were clean, hence the permit to move.

Now, the point is this: When can an inspector be absolutely sure that a colony is clean? For it takes about forty-eight hours after infection takes place (so we are informed by Dr. White) before it becomes visible to the naked eye. So now it looks as if we are all up in the air again and that an inspector will not only have to be an expert beekeeper, but a bacteriologist as well.

It is stated that "Cheap foreign honies are the drawback to bee culture in Great Britain." Whether *Canadian honey* is put into this category or not matters little, for the object of this article is to demonstrate that we in Canada produce an article that, once tasted, there can be no doubt of its quality. The *grading rules* in most of the leading associations are *very drastic* and call for quality in every feature. Our crops are mostly gathered from clover, basswood, willow herb, sweet clover, and buckwheat. The last two being second grade honey, but only from a colour standpoint, as once the taste has been cultivated for buckwheat honey many prefer it to clover.

In the *packing* of the honey great care is used to keep the product uniform in colour and flavour, as it has been found that the general public look upon various colours and flavours with a certain amount of suspicion, even going so far as to say that one or the other is adulterated.

Most of *the retail trade* is supplied with the honey in glass containers holding about twelve ounces and from that up to about three lbs. The next size is usually a tin pail holding five lbs., and all the way from that up to sixty lbs., and the demand for family use of these sixty lb. cans is by no means small as *the public here are trained to look upon honey not as a luxury but as food* in the same class as jam. At every fair and exposition the beekeepers advertise their produce, signs and free samples being much in evidence.

The governing bodies of all the provinces take a deep interest in honey production, and the industry is protected by various *laws*. It might be said, in passing, that these laws, whilst being as good as can be made, come far short in accomplishing the ends aimed at, but that is another story. Special *grants* are made for educational work, and experts are sent through the country to give help and advice wherever needed. The care of honey and wax is a special feature with every apiarist who does business on a large scale, and nothing is neglected that will make for a brighter and a cleaner product.

Of course we have *the unscrupulous jobber* who buys the low grade tropical honies and by the addition of a little local honey palms it off as all Canadian. But his days are numbered, and when one is convicted measures are taken to keep him out of the business for all time.

One or two organisations have a *special label* which is sold to members, and the honey sold under this label is absolutely guaranteed as to point of production and quality. There is a heavy penalty for misuse of this label.

Taking everything into consideration, we in this country (Canada) are making every effort to place honey where it rightly belongs, *i.e.*, on the table three times a day.

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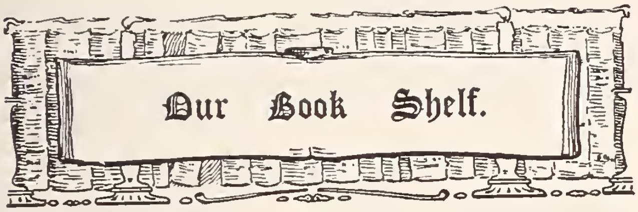

Our Book Shelf.

Books still accomplish miracles; they persuade men.—CARLYLE.

THE DADANT SYSTEM OF BEEKEEPING.*

By C. P. DADANT.

The Dadant publication which has been longest before the public is "*Langstroth on the Honey Bee, Revised by Dadant*," which is a very comprehensive work arranged in such a way that the information is very readily available. Were I restricted to a single volume on the bee—fortunately I am not—it would be "*Dadant's Langstroth*" that would be chosen, because from no other single book on the bee have I been able to learn so much. The Dadant System is the ninth and latest volume to be issued from the office of the oldest bee periodical in the English language. The book is not very large, extending to slightly over 100 pages, but it is weighty in more senses than one. It is not for the beginner, whose wants are fully met by other publications in the Dadant Library, but rather for the advanced and thoughtful beekeeper, who has decided to keep bees on business lines and not for the fun of the thing.

American bee books in general give much more food for thought than those published in Britain. Our bee guides are rather like cookery books, full of ingenious recipes for managing bees, but the writers rarely discuss the principles on which their advice is based. British methods must be followed blindly, and the novice dare not modify or adapt them to the conditions of his own locality and practice. There is too much of "*ispe dixit*." The sweet reasonableness so characteristic of American writers on the bee is well exemplified in the work before us. We may disagree with Mr. Dadant, but we cannot say that he makes mere assertions or adopts views which he has not fully tested. "No theory is strong unless it is backed by the facts of experience. The experience must also be secured on a sufficient scale to make it proof against possible exceptions." (Page 23.)

Expressed in a single sentence we might say that the Dadant System consists in the use of a large brood chamber for the production of extracted honey to be stored in shallow frame supers tiered upwards. After many years of experiment, the Dadants are convinced that they can secure twice as much honey in extracting supers as would be stored in sections. The brood chamber contains 10 frames Quinby size, and the total comb area is 1,890 square inches. The system begins by trying to ascertain how many cells are likely to be required for brood in the middle of the breeding season. Dzierzon found, by actual count, that a queen might lay 3,000 eggs in 24 hours, and this figure has been adopted by most British writers on the bee. But the bee, like other animals, can be greatly improved and developed by careful selection and breeding, and it is now certain that many queens are capable of exceeding even this performance. Mr. J. Herrod-Hempsall stated recently (BEE WORLD, Vol. 1., page 126) that it is not unusual nowadays to find queens that will keep 20 standard combs occupied with brood. One is tempted to ask, then, why any serious beekeeper should bother with queens that are content with 10 standards.

We must take into account also the cells required for the storage of pollen and honey, and Mr. Dadant allows about 20,000 cells for that. Much more is available for storage in autumn when the breeding is slowed down, with the result that little autumn feeding is required. We are often told that a large stock of bees will winter on from 20 to 30 pounds of honey. Mr. Dadant says: "We want 40 pounds at least to make sure that there will be no shortage and no stint in spring breeding. . . Better have 50 pounds than only 25." The smallness of the British hive entails heavy autumn feeding, and frequently "stimulative feeding" has to be resorted to in spring. One authority suggests one wine-glassful of syrup to each stock for six or eight weeks. One has visions of a commercial apiarist with his thousand stocks going round each evening for six or eight weeks with a thousand wine-glassfuls of syrup! Clearly British beekeeping has suffered too long from authorities who keep two or three stocks for fun and make a living at something else.

The Dadant Hive has 10 Quinby frames, 18½ inches long and 11¼ inches deep, containing 1,890 square inches of comb, or well over 100,000 cells. This gives ample space for the brood of the most prolific queen yet noted, and room also for the large winter store recommended in the system. The British hive of 10 standard combs is little more than half this capacity. It has 1,080 square inches of comb or about 59,000 cells, and is inadequate for the brood of a queen laying no more than 3,000 eggs per day. This size for a hive was adopted quite by accident. About 60 years ago Woodbury, "Devonshire Beekeeper," made a hive "14½ inches square and 9 inches deep," and all standard British hives were of this size and shape till quite recently. There was a big break-away last season, and several hundred big hives were sold, so we may take it that there is a widespread opinion that a larger hive is desirable. We have to decide whether increased size is to be obtained by using more than 10 standard frames, by deepening the standard frame, by using the Simmins Commercial frame, 16 inches by 10 inches, or by adopting the Langstroth or other foreign standard. *Personally I think we could hardly do better than adopt the Dadant Hive.*

In the Dadant Hive are retained some European devices usually discarded by American hive makers. It has, for example, an "enclosed" floor board, by which is meant that the sides come down over the edge of the floor—except in front—although this is not accomplished by the use of plinths as in the British pattern. The cap or roof also telescopes over the brood chamber so as to exclude water and robber bees. The sealed cover usual in America is also replaced by quilts as in Britain, and Mr. Dadant believes greatly in a *straw-mat quilt*. This is placed next the bees in winter to allow moist air to escape upwards, but enamelled cloth quilts are placed next the combs in summer. Wintering on summer stands, another British fashion, is part of the Dadant system, as it certainly ought to be, since there are in Illinois usually one or two days in each winter month warm enough to enable the bees to fly.

The Dadant System may include feeding with sugar syrup, either in autumn or in spring, and the author does not share the view that sugar-syrup is hurtful as winter stores. But it is clear that feeding is "irregular" and is not practised to anything like the extent that it is in Britain. Plain syrup is used unless difficulty in inverting the sugar is anticipated when a proportion of honey is added. In Britain it is usual to invert the sugar by boiling for about five minutes with some acid—usually acetic acid in the form of vinegar. Some of our advisers do not appear to know why an acid is used, and merely recommend that vinegar should be added to the syrup.

In removing supers, Mr. Dadant does not begin by kicking off the roof, *à la Coggshall*, but raises the pile of supers (six are shown in the illustration) one end at a time and inserts a super-clearer. Perhaps the author will forgive me for not quite understanding how this is done, and out of his goodness he may give a fuller explanation in the *Am. B. J.* or the BEE WORLD. I am sure it is quite simple if one only knew the way.

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* Published by *The American Bee Journal*, Hamilton, Illinois, U.S.A. 118 pages. Profusely illustrated. Price 7.00 dol.

It is often asserted that a queen will not readily lay in sections, but that she is practically certain to produce brood in shallow extracting frames unless queen excluder is used. The Dadant experience is the very opposite, and although producers of extracted honey, they do not use the queen excluder. "It is a nuisance." Why this difference? *Clearly the British queen goes into sections occasionally and into shallow frames usually because she has no room below for her brood.* The British apiarist refuses to take this very plain hint that his brood chamber is too small, and uses queen excluder. But queens and hens are for laying eggs. What would we think of a poultry-keeper who said: "Confound those hens, they are laying too many eggs," and invented an apparatus for restricting the output? Yet we use queen excluder without a smile, because if a large number of people make the same mistake we fail to note that a mistake is being made.

Mr. C. P. Dadant does not believe in handling bees without smoke, and he always carries a veil in his pocket, a practice which conduces to comfort both for the bee and the beekeeper. Those beekeepers who boast that they never use a smoker or a veil, and that they never mind a sting, are not beemasters of the highest type. It is very encouraging for the novice to learn that Mr. Dadant, the younger, was very timid with bees, very much afraid of stings, and that it was not till he was 18 that he became an active apiarist, though he had been initiated in the main secrets of the hive at an earlier age.

In the Dadant System only pure Italian bees are used, not because no other variety is so good, but because crossing is so immediately apparent in the Italian. Dr. Miller bred from his best stock without considering purity of race, with the result that his bees were hustlers and high-strung. Later he got pure Italians, very nice bees, beautiful to look at and easy to handle, but "they did not begin to store like his vicious hybrids." He confessed, though, that if he were starting again he would breed only from pure Italians, and expect to get just as good hustlers "with less tendency to change." Breeders of other stock who have perfect control of mating frequently find that a first cross is excellent, but that further inter-breeding produces results not to be desired. This is in accordance with Mendelian theories of inheritance, and is expressed by Mr. Dadant in the following terse sentence: "*Experience has taught us that fixed qualities are rare in hybrids.*" Darwin was quite convinced that the crossing of varieties produced offsprings that were larger, more vigorous and prolific, and more resistant to disease. But the production of definite crosses in the bee presents peculiar difficulties, which were apparently not realised when attempts were recently made to replace the British bee by a cross between the Italian and a mongrel imported from Holland.

The Dadants were never in beekeeping merely for their health. Charles Dadant began with two stocks of "common" bees, and to-day more than 500 stocks are maintained, and the business supports several families and has made them pecuniarily independent. Yet the bees always paid beforehand, in product, for all expenses put in their management and in numerous improvements.

The pessimistic Britisher may say that the Dadant success is nót due to that Dadant System but to the climate of Illinois. But we read: "We have had a number of seasons when the white clover, whose bloom forms the principal crop of our locality, was entirely killed by the drought of the previous season." Have we not in Britain the finest—because the most varied—climate in the world? If those Yanks and Canucks would confess the truth, I guess they get very tired of seeing, day after day, a hard, blue sky, and a blazing sun beating down upon a parched and dusty earth. The British bee, and the beemaster also, enjoy at frequent intervals the inestimable pleasure of "sunshine after rain." There is then a freshness and a sweetness in the air, a greenness in the foliage, and a brilliance in the flowers, that make one think of a new heaven and a new earth. Take courage, O Bee-lovers, we are right beside the finest honey market in the world, and on yon blue hill grows *Calluna vulgaris*, producing the finest honey that any beemaster can secure.

The appearance of a book of which the central idea is a bigger hive, leading to larger returns with less labour, is peculiarly opportune, because the British beekeeper is quite definitely at the parting of the ways. In the production of honey in quantity we have been so definitely outclassed by America and our own Colonies that we must either give up the contest or make a radical change in our ideas and our practice. The beekeeper who is persuaded that the British system cannot be improved upon—though it has developed a disease peculiar to this country and especially destructive in apiaries managed by the highest experts—should not disturb his ideas by reading this little book. But the beekeeper who is not wedded to the old ways, who dreams of the day when Britain shall again lead in methods of apiculture, should procure the Dadant System, and so far prepare himself for a great change and a great advance in British beekeeping.

JOHN ANDERSON.

The Arena: Letters to The Editor.

Criticism is a disinterested endeavour to learn and propagate the best that is known and thought in the world.—MATTHEW ARNOLD.

THE BRITISH STANDARD FRAME.

SIR,—The British Standard Frame is too small. No one who has given a larger frame, say the Simmins (16 inches by 10 inches) a fair test alongside the Standard is likely to dispute this. It is perhaps unnecessary to say that running a single stock for a single season on large frames does not give good grounds for comparing the merits of the sizes of the frames used. If the stock on the large frames does better than those on the smaller, with which it is compared, it might be because it is headed by a better queen, or for some other reason; or, on the other hand, if it does worse it may be because of an old or otherwise inferior queen or faulty management. But when a number of stocks on large frames are kept alongside an equal number on small frames, for at least two seasons, and when the bees are all of the same strain, then we have a just basis for comparison. And when this test has once been made, the experimenter is never likely to dispute the fact that *with large frames*:—

(1) *Swarming* is much more easily *controlled*, as the queen has a much larger brood nest at her disposal, ensuring:

(2) A much larger *population* to gather what nectar is available, and therefore:

(3) Making sure of *more surplus* than would otherwise be obtainable.

In the U.S.A., Canada, Australia, New Zealand, South America, the West Indies—everywhere, in fact, where honey production is conducted on a commercial scale, we find the frames in use much larger than the British Standard, and this fact alone should cause us to enquire whether we are not needlessly handicapping ourselves by using such a small frame in this country.

It may, of course, be objected that the conditions here are different from those abroad. They are. The conditions in this country are different; but the conditions everywhere are different from those everywhere else—even from those in other parts of the same country. But the bees are the same in their requirements. They react to their environment in the same way, whatever the latitude or longitude may be. If the bees swarm in Britain through the brood nest becoming congested, they also do exactly the same in Mexico or anywhere else. If the strongest stocks possible are desirable in New York State to make the most of the honey-flow from clover or buckwheat, strong stocks are equally necessary in Kent or Midlothian to secure whatever nectar is available there.

The honey produced in the United Kingdom cannot be beaten as regards its quality and flavour, by that from any other part of the world, but as regards its production, we are in a backwater. To a certain extent this may be attributed to our variable climate, but more, I think, to our *methods.* In any case, the weather is beyond our control, but *it lies with us to so manage our bees as to get the best results from them.*

Unless we control swarming we cannot have our stocks at their strongest, and unless our hives are strong and overflowing with bees we cannot expect the maximum honey crop.

By retaining our present Standard frame we are only putting difficulties—needless difficulties—in our way. It is only by the most skilful management in most experienced hands that the happy combination of a strong stock on Standard frames and no swarming can be obtained—and probably not even then! But with a frame such as the Simmins all our efforts are made much easier. A well-bred queen (others we do not want) demands more room—much more—than we usually give her, and on the Simmins frames she gets it. With a large brood nest and enough supers, swarming should be a rare occurrence, while the large number of bees can be depended upon to secure the greatest possible amount of honey. In addition to this the bees winter *much* better on large frames and build up more quickly in the spring; neither do they require so much feeding. No small items.

It is usually rash to prophesy, but it seems safe to say that it is only a matter of time before the present British Standard frame is relegated to the scrap-heap and the museum. Not till then will there be a honey producing industry worthy of the name in this country.

Yours faithfully,
D. M. CUTHBERTSON.

Finmere, Bucks.

THE IMPORTANCE OF KEEPING BEES OF A KNOWN STRAIN.

SIR,—In connection with the large number of foreign bees imported into this country, I should like to give an instance of the importance of keeping bees of a known strain.

A few years ago I had a stock of "hybrids" which swarmed *after* the recognised swarming time. I could not find the swarm for some days and then found they had started to build comb on the branch of a pear tree, and I had great difficulty in dislodging them. This was no doubt due to some strain of tropical blood.

With our own black bees, we get few of these annoying variations which, from a business point of view, are fatal.

Yours faithfully,
E. F. LEDGER.

Lee, S.E.12.

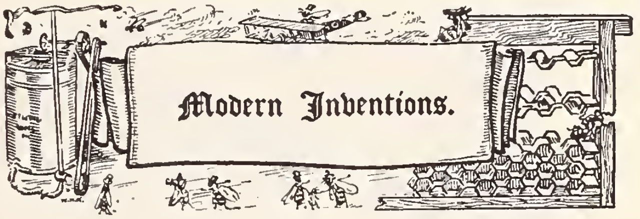
BRITISH BEE GOODS.

SIR,—On page 108 of your last issue you observe that leading appliance manufacturers "are inviting beekeepers in no half-hearted manner to visit their showrooms and factories." In the same excellent number there appears also a letter from Mr. J. E. Lockwood complaining of the standard of British bee ware. All manufacturers will, we think, agree with your very fair comments on this letter, but we should like to add a suggestion that Mr. Lockwood should take advantage of the invitations referred to above, and ascertain for himself that British manufacturers are already endeavouring to overcome the difficulties and shortcomings of the past and attain the highest possible standard of quality. For ourselves, we should be delighted to see him, and would endeavour to convince him not only that quality can be obtained in this country, but also that the purchase of British appliances by the beekeeper is as beneficial to the industry as is the purchase of British honey by the consumer.

Yours faithfully,
W. L. LORDAN,
(Managing Director).

E. H. Taylor, Ltd.,
Welwyn, Herts.

[Mr. Lockwood's letter was published in the spirit that the ventilation of its subject matter in private circles, to the extent of being an open secret, would do more harm than good to the industry in this country, and that its publication, therefore, should afford an opportunity for legitimate ventilation of views and a helpful discussion. We are glad to receive Mr. Lordan's assuring communication and to note that he appreciates the good motive of the writer. The discussion may now favourably end.—Ed.]


Modern Inventions.

Necessity is the Mother of Invention.—**Pr.**

The Benton Queen Cell Nursery.

In a recent issue of the *New Zealand Fruitgrower*, the apicultural section of which is under the able editorship of Mr. Isaac Hopkins, we read from the pen of Mr. Y. H. Benton, of Featherstone, N.Z., a descriptive article of his queen cell nursery which is already a popular appliance among queen breeders in the Dominion. He says:—

The need of such an appliance as this has long been felt by the beekeeping fraternity of the world. That artificially-heated incubators have been tried, and are still being used by prominent queen breeders, I am well aware, but they are, however, now condemned by most. An artificially-heated appliance for the incubation of cells did not appeal to me in the least, so I determined, by adhering as closely as possible to nature, to devise an appliance which would derive the necessary heat for cell maturing from the colony of bees itself, and at the same time meet all the requirements of those who rear queens either for sale or for their own use. The advantage of such an incubator as this is obvious. It greatly facilitates not only the handling of cells, but reduces the cost of rearing queens to a mere fraction of the time and labour required by other methods.

An appliance which permits one to inspect, put in, or take out cells or virgin queens whenever and so often as one likes without in any way interfering with, or opening up the colony of bees, which supplies the necessary heat in a natural manner, must, I think, be regarded as a big advance in present-day methods of caring for cells.

The illustration shows the appliance in detail, the exterior of which is similar to a half-storey body. Three separate compartments are arranged, each covered top and bottom with wire gauze. Into these compartments drawers slide, containing combined nursery and introducing cages, as shown. Each drawer holds 16 of these cages, of which more anon. One end of this appliance opens on a hinge, exposing to view the ends of the drawers. To put a batch of cells into the nursery occupies a very few minutes. One simply goes to the back of the hive, pulls out a drawer, inserts the cells into the cages, and closes the appliance again.

Between these compartments, and on either side of them, are interstices through which the bees pass unchecked from one hive body to the other, hence the storing of honey will go on as usual in the supers above, with very little, if any, inconvenience to the workers. The nursery-introducing cage shown in the photo-illustration (Fig. 55) is perfect in every detail, both as a nursery and introducing cage, but any kind of nursery-introducing cages may be used.

The *advantages* of the appliance may be summarised as follows:—

1.—It affords (in the opinion of Mr. Benton) better facilities for handling cells and virgin queens than an artificially-heated incubator.

2.—Cells can be put in or inspected, and virgin queens, when emerge, can be taken out in a minute or two and without the use of smoke.

3.—The bees in the hive upon which the nursery is placed are not in any way disturbed when putting cells in or taking queens out.

4.—It accommodates 48 cells, each in an approved nursery introducing cage, at one time.

5.—It gives greater facilities for handling the cells expeditiously, and thus there is no risk of the cells being chilled.

6.—As there are no bees adhering to the nursery cages, consequently there are none to brush off, as is usual with other nurseries.

7.—The appliance saves time, trouble, labour, and allows one to avoid many of the risks incurred in handling cells, while providing a nursery for queens.

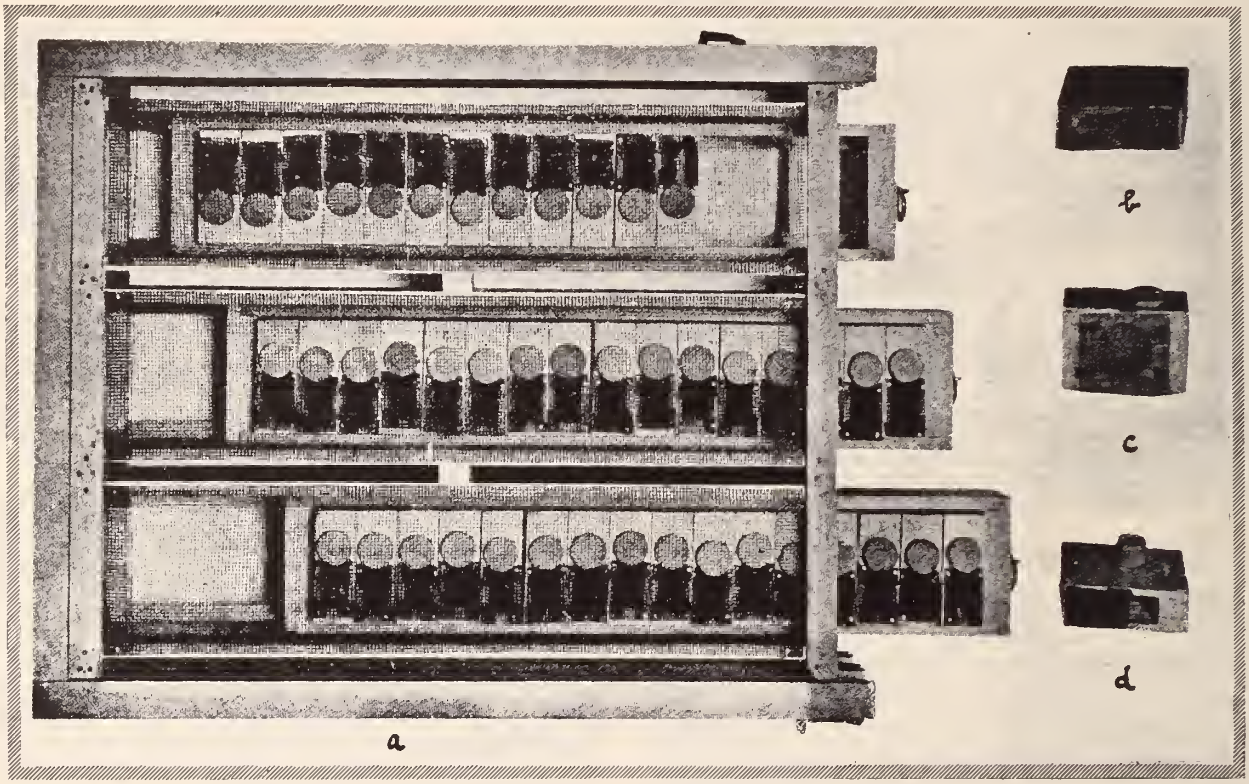


Fig. 55.—The Benton Queen Cell Nursery.

(*a*) Complete nursery with drawers and queen cages in position; (*b*) bottom of cage ventilated; (*c*) one side of cage for pressing against honey when introducing queen, so she can feed herself; (*d*) top of cage with cell-cup.

History is philosophy teaching by examples.—Bolingbroke.

WITH A PREHISTORIC PEOPLE.-BEES IN BRITISH EAST AFRICA.

By E. C. Middleton.

In his work with the above title, Mr. Routledge gives an insight into native bee management in the Kiku-Yu country lying between Naorobi on the East and the Victoria Nyanza on the West at the foot of the Aberdare mountains. The country is no longer wooded, beyond certain sacred groves on the hill tops, and certain gigantic trees which are preserved as sacred. Apart from these examples there may be seen scattered about the landscape certain ill-nourished specimen trees known as "*bee*" *trees.* The inhabitants, known as Akiku-Yu, are extremely fond of honey, which forms one of the seven dishes that go to make up the prevailing menu of a fashionable feast amongst these natives, and no opportunity is lost of collecting it. To facilitate this a tree trunk (often the mimosa) of eighteen to twenty-four inches girth is cut up into lengths of about five feet. These lengths are sunk into the ground to a convenient depth and angle, and are then converted into hives—invariably by a man, who, having fixed an axe blade in the end of a shaft of wood, proceeds to remove the interior of the tree trunk by using the tool as a pestle might be used in a mortar—punning away at the log's interior.

When the walls of the log are reduced to a thickness of about three inches and the outside is dressed to a respectable appearance, a groove, some two inches in depth, is cut around the inner surface of the barrel end; into this boards are fitted after the manner of a barrel head. No entrance is provided beyond the lack of "fit," and through these accidental openings the bees make their entrance.

To complete the *hive*, the emblem or badge of the "clan" to which the hive belongs is marked upon it by poker work, but the Akiku-Yu, among whom Mr. and Mrs. Routledge resided some five years, add no further decoration, although the Akam-Ba race, from whom they are descended, and who are still neighbours, often add far more decoration than a mere device of identification. The hive, being so far completed, is carried to one of the "bee" trees alluded to, a rough support is constructed by lashing other boughs to the limbs of the tree by means of trailing creepers, and upon this support the "bee box" is further lashed.

Here, again, the customs of these neighbours differ, as the Akam-Ba suspend their boxes by slings, the hive being suspended from its support instead of resting upon it. Bees are not "swarmed" or "run" into these boxes; the latter are, when newly erected, decorated with a collection of sweet smelling flowers as an attraction, in lieu of the beer and sugar in our own past history; the rest is left to nature. Our *smoker* is unknown; but to collect the harvest, torches are prepared and at night the bees are smoked, burnt, or driven out and the honey "forcibly" collected into leathern bags,† regardless of colour, brood, or anything else; extractors or extraction are unknown; it is just devoured as it is!

Theft from the honey boxes is a serious offence. Any unauthorised person surreptitiously visiting and robbing one of these "out" apiaries—which may be miles away from the legitimate owner's house—on discovery meets with punishment. For stealing honey from a bee box, if the thief be a man, he is fined three goats; if a woman, one goat; and the same latter fine is inflicted upon a child. If the thief is incorrigible he is "killed like a sheep." In an adjoining district a man stealing is fined 10 goats; a woman, boy or a very old man is fined three goats. Banishment is the punishment for a second offence, and burning alive follows a third. This must certainly have a restraining influence!

An elementary *mead* is made by mixing two parts of water to one of honey, straining and drinking within 24 hours—though whether this time limit arises from lack of keeping qualities or appreciation of the beverage, Mr. Routledge does not say.

Honey forms a very saleable commodity in the local native markets, to which it is sent in jars of, say, 10 lbs., selling at the equivalent of 2/8 per pot. As the work was published in 1908, this is evidently a pre-war price. The hives—mwa-tu—also may be purchased in the market for 40 piece, equals 10d. each in our coinage.

The *Pharmacopœia* of the Akiku-Yu seems to have but one formula, in which honey plays a part, that is in a mixture known as "Cheme," made of honey, castor oil, sheep fat, goat's milk and other ingredients less appetising. It is said to be "efficacious for a cough," but apparently has other properties. The natives think that a little of this mixture placed on the gate of a cattle pen prevents thieves entering to steal. Should a person be *in extremis*—sick unto death—its application seems peculiar. A spot is placed on the forehead, the tip of the tongue, the navel, the buttocks and the toes, and he will recover! I think I had better adjourn and apply some at once!

* * *

'Tis better that a man's own works than that another man's words should praise him.—Sir R. L'Estrange.

THE CAMBRIDGE FLOORBOARD.

A presentation specimen received at the *Apis Club* Museum of this intelligent anti-robbing and anti-spring dwindling device, just marketed by Messrs. E. H. Taylor, Ltd., exhibits a standard of workmanship and a quality of material which reflect credit on the makers, especially if adhered to in mass production

It consists of: (*a*) floor board made of three parts: a detachable centre with a prolonged slot which forms, when *in situ*, a "floor board entrance" to the hive, and according to the position of the slot, the entrance would be at the front or the back, the remainder of the floor board being fixtures; (*b*) side supports which form the stand; (*c*) a hinged alighting board which, when it is desired to protect the colony from robbing is lowered by turning down the wooden buttons supporting it; the central part of the floorboard, having been previously reversed by placing its slot backward, now provides a back entrance, to which a long alighting board with a gentle slope leads.

Granting that the best *anti-robbing* device is the real strength of the colony, the *Cambridge Floorboard*, nevertheless, has inspiring features that lend themselves to the convenience of the beekeeper. It can be adapted or made to suit practically any hive.

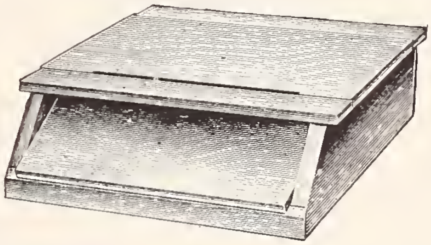


Fig. 56.—The Cambridge Floor Board in Summer Use.

In practice, it seems to us that the slope of the alighting board for summer use is unduly excessive. Further, the back entrance is by no means an unmixed boon in winter, if no provision in the shape of a hinged door underneath it, or the like, is provided, so as to give facilities for cleaning it from *débris* and dead bees, should it become chocked.

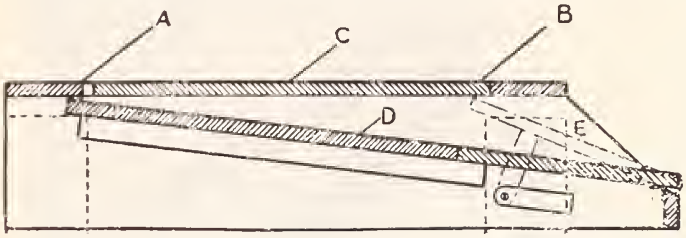


Fig. 57.—The Cambridge Floor Board in Autumn and Winter Use.

(A) The Slotted Beeway, turned towards the back of the Hive; (E) The front part of the Flight Board, which can be raised or lowered according to the desired position of the slotted beeway, whether at the front (B), or the back (A), after turning the central detachable part (C) accordingly. When lowered it forms with the board (D), a continuous slope up to the entrance, previously adjusted at the back.

In summer, the advantage of removing the central part of the floorboard, and lowering the front part of the flight board, thus giving to the bees an abundance of *ventilation*, when required, is a real blessing.

It is claimed for the appliance, when the back entrance is in use, to be a preventative of spring dwindling by shading the entrance. Within limits this is feasible. Unfortunately, however, unseasonable high temperature on windy spring days will frustrate such a precaution.

The drawback to the *Cambridge Floorboard* is the necessity of lifting up the rest of the hive in order to make re-arrangements. With a spare floorboard, previously arranged, this should be no great inconvenience, and if quickly done will do no harm.

Taken all in all, the appliance, which was previously in private and experimental use for some time, is decidedly worth introducing to the public.

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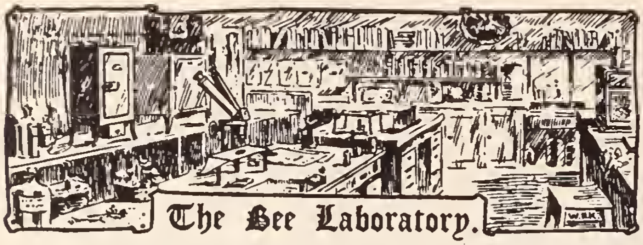
† THE BEE WORLD, Vol. I., p 233.


The Bee Laboratory.

Science is nothing but trained and organised common sense.—Huxley.

A "HERMAPHRODITE" BEE.

By Miss Annie D. Betts, B.Sc.

Some little while ago I had the good fortune to be able to examine a very interesting specimen of "hermaphrodite" bee—or, more correctly, as "Delta S" points out (p. 131), a gynandromorph. My best thanks are due to Mr. H. M. Stich for his kindness in sending it to me.

These freaks are not so uncommon as is often supposed (Cowan, "*Honey Bee,*" p. 165). Mr. Cowan's description of them leads to the conclusion that the dividing line between the parts of different sex is generally transverse, though cases where the head was half worker and half drone are mentioned. Comstock ("*Introduction to Entomology,*" 1920, p. 156) states that the division is longitudinal, and does not mention any possibility of its being transverse. Further investigation is evidently needed.

In the specimen under consideration, the dividing line is longitudinal, but not quite accurately median everywhere; the right side is male, the left side female. The general appearance of the head was that of a small drone. The *labium* is assymetrical, being bent to one side; the left side parts being somewhat shorter than those of a worker, the right side parts somewhat longer than those of a drone (Fig. 58). The tip of the *ligula* is worker in appearance, the "spoon" being of normal worker size and form. The *labrum* is wholly drone-like, the hairs all over it being branched, as in drones. This is not unexpected; for embryologists tell us that the labrum does not arise from the fusion of paired structures, but is single and median from the first (Nelson, "*Embryology of the Honey Bee,*" p. 108); so that we should expect to find it wholly of one sex. The right mandible was unfortunately not preserved; the left is of worker shape, but with a slight indication of a notch in its edge.

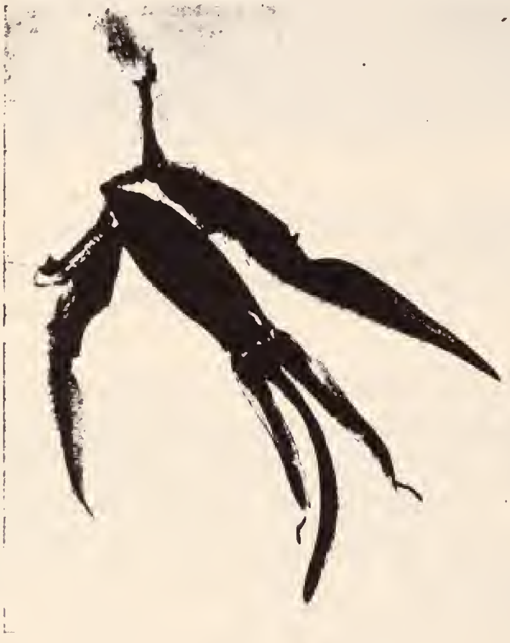


Fig. 58.—Mouth parts of a gynandromorph.

The *hypopharyngeal plate* has on the left side a well-developed gland duct outlet, of nearly normal worker size; the right side has no gland opening, and is drone-like in character. The state of preservation of the bee did not allow of a successful dissection of the glands.

The *antennae* are alike in length and in general appearance; both have twelve segments, but in both the terminal segment is of abnormal length, and may represent two segments fused. (A trace of a division is visible in the left antenna.) The ratio of the length of the scape to that of the whole antenna is 0.226, against 0.209 for a drone and 0.324 for a worker. It is thus nearer to the drone than to the worker value. The shape of segments Nos. 3 and 4 is drone-like (the scape being No. 1) in both antennae. We may on the whole, therefore, describe the antennae as male, but with traces of female characters.

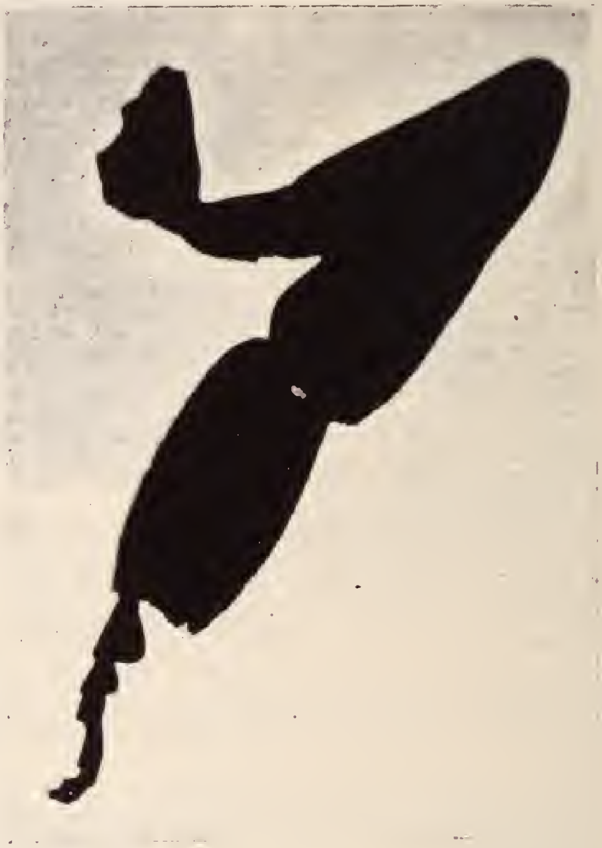


Fig. 59.—The third left leg of a gynandromorph.

This tendency for parts of the one sex to show traces of the influence of the other sex occurs frequently in this specimen. The wings are a case in point. While the right wings are male in general character, and the left female, neither conforms perfectly to the standard of its sex. In all measurements, however, the right wings are nearer the drone dimensions than are the left.

The *right legs* have drone claws, the second leg planta is cylindrical as in the drone, and the third leg is drone-like (Fig. 60). The *left legs* bear worker claws, the second leg planta is broadened as in the worker, and the third leg is typically worker (Fig. 59), the corbicula, pecten, auricle, and strigilis being all well-developed.

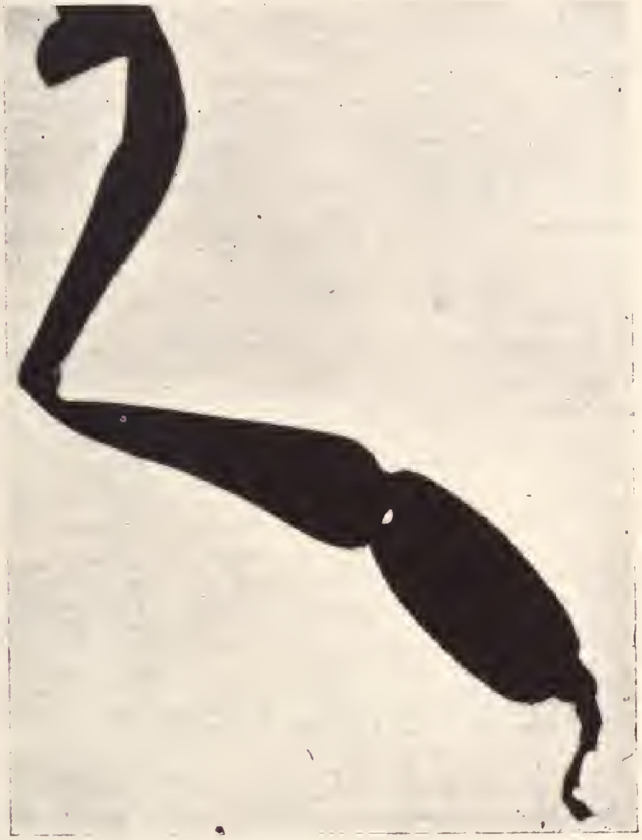


Fig. 60.—The third right leg of a gynandromorph.

The internal organs were too much decomposed to dissect satisfactorily, so attention was concentrated on the sexual organs, the other abdominal viscera being neglected. A fairly well-developed spermatheca was present, and probably an ovary. (What was believed to be the latter was much disorganised, but presented a naked-eye appearance smaller than, but much like that of the decomposed ovary of a queen.) One testis (or testis-like body) was found (Fig. 61), as also a male organ with all its parts apparently present, somewhat

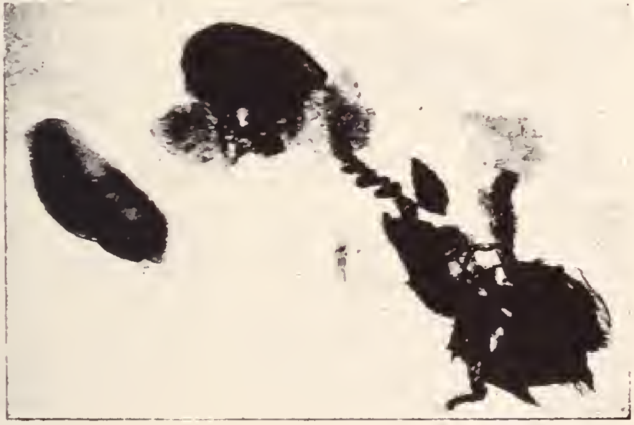


Fig. 61.—Sexual organs of a gynandromorph.

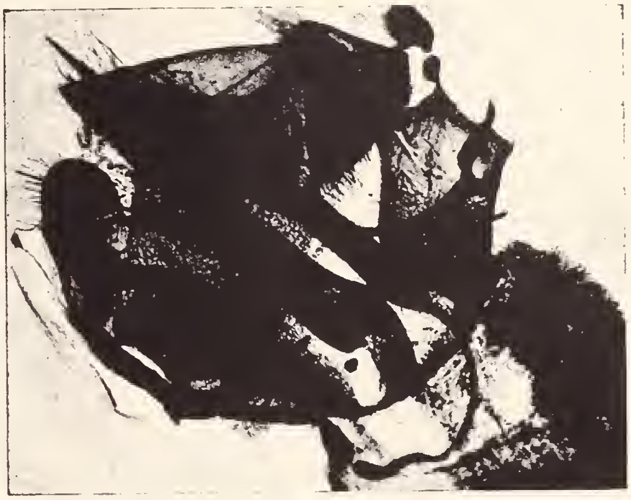


Fig. 62.—Rudimentary sting of a gynandromorph.

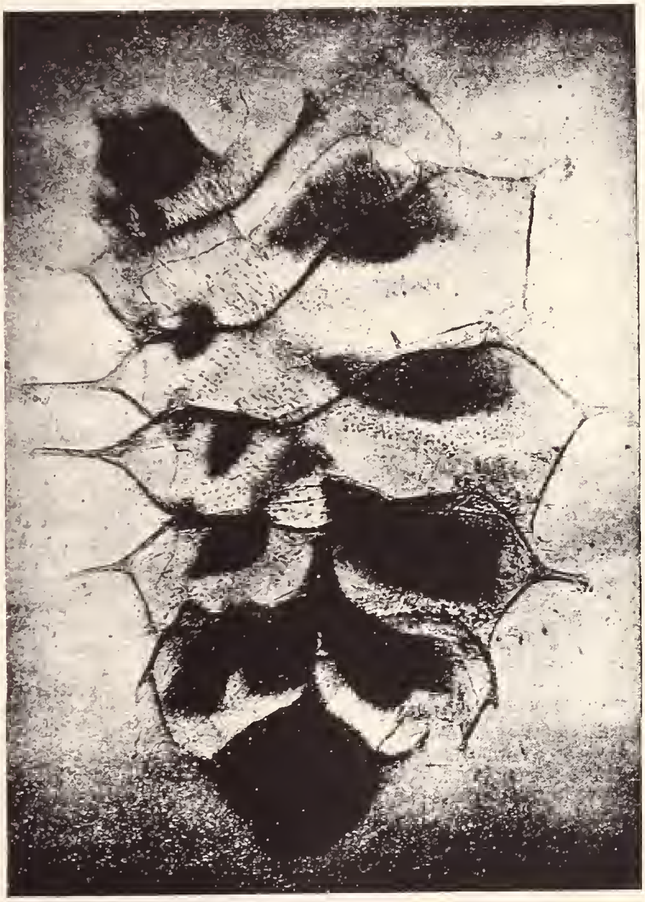


Fig. 63.—The underside of a gynandromorph, dissected.

modified near the anal extremity by the presence of a *rudimentary sting* (Fig. 62). (Note that in Figs. 61 and 62 the point of view is from beneath the bee, looking upward.)

The lancets of the sting are present, though malformed; so is the upper part of the sheath, but not its point. The hairy triangular plate characteristic of the drone is seen on the right hand side; the corresponding plate on the left is rounded. These, and other interesting points, must be left for a future article, in which it is hoped to give an account of the development of the sting, and to show how this interesting rudimentary sting confirms the discoveries that have been made on that subject.

The underside of the gynandromorph is, as seen in Fig. 63 assymetrical, the left side (right in the figure, as it is seen from beneath) approaches in appearance that of a worker, the right side that of a drone. Note the long *apophyses* (lateral projections to which, in life, muscles are attached), characteristic of the male sex, on the right-hand side. The number of segments present is the same as in a worker. The consideration of this, and of other points, must be postponed till the discussion of the sting aforementioned.

The bee was the offspring of an Italian queen, and showed on the dorsal surface of its abdomen the colouring characteristic of this race; the markings on the right side being those of a drone, on the left, those of a worker.

In this specimen we have seen that many of the apparently male parts show traces of female characters, and *vice-versa*. The question, therefore, arises: How far is the sex of an organ determined by the presence or absence of an "X" chromosome, and how far by the action of hormones? In the higher animals, it is known that the secretions of certain ductless glands influence powerfully growth and development, especially that of the sexual characters. If there are similar hormones in the bee, their presence would explain the influence of one sex on parts ostensibly of the other sex. It would be of interest if some physiologist could tell us whether anything is known as to hormones in insects I have a shrewd suspicion that something of the sort is concerned in the conversion of a worker larva into a queen. In any case, the subject would be a fascinating study for any bio-chemist able enough to undertake it.

Notices

Annual Sweet Clover. – The *De Graff Food Company*, De Graff, Ohio, U.S.A., are launching a publicity campaign for popularising it. They say in an announcement: "This Annual White Sweet Clover blooms for bees in three or four months, and continues to bloom for a much longer period than most plants used for the purpose. Many beekeepers have used it and say that it is the greatest clover yet tried. Quick growth, and a great wealth of honey-making blooms. This is the clover that was discovered by Prof. Hughes, of the Iowa State Agricultural Experimental Station at Ames, Iowa. . . It matures in a single year, so that blossoms for bees, hay or seed may be had in one season. It provides quickly a rank growth for plowing under." They offer for sale packets of seeds (each containing 14,000 seeds, sufficient for thorough trial) at 1 dol. per packet. Many of our readers will doubtless avail themselves of this offer. In so doing they are solicited not to forget mentioning THE BEE WORLD.

Diagnosis of Bee Diseases.—Miss Annie D. Betts, B.Sc., of Hill House, Camberley, Surrey, is kindly undertaking to examine free of charge to our readers specimens of live bees and combs with brood, for suspected disease. Samples are not returnable. Applicants are requested not to forget enclosing stamped addressed envelopes.

Where to Stay.—We reserve Saturdays for visitors to Benson, who will find comfortable accommodation at "The White Hart," "The Crown," or at "The Horse and Harrow." The nearest railway station is Wallingford, G.W.R. There is an omnibus as well as a boat service between Reading, Wallingford, Benson, and Oxford.

Publicity Leaflets.—Readers of the BEE WORLD desirous of further popularising the paper and increasing its circulation by recommending it to beekeepers and would-be advertisers can have *free* leaflets and specimen copies (when available) on application to our office.

Aluminium "Semicombs" for Exhibition.—We regret we have no spare specimens to loan at present. We are reminded also of mentioning that suppliers retailing this appliance are doing so at a very low commission, for the sake of popularising it in the first instance. Consequently, they are not in the position either to present specimens or to allow a discount on sales.

Subscriptions.—Members of the *Apis Club* whose subscriptions have become due are reminded that the minimum fee adopted since May, 1920, is 10s. 6d. to individual beekeepers, and £1 1s. to Beekeeping Societies and Business Establishments.

Books and Specimens.—Gifts of books and interesting specimens to the *Apis Club* Library and Museum will be gratefully received and duly acknowledged.

Errata.—We have not practised before drawing attention to minor printing errors. In our last issue, however, an unfortunate dropping of some lines and intermixing of others occurred at the foot of the first column, page 122, whilst the last pages of the issue were being hurriedly set up. The disfigured paragraphs should read as follows:—

> "Again, with reference to the Metal Foundation proper, the views, experiments and observations that led to developing such an appliance are sufficiently known not to need recapitulation. They have established the possibility, with reasonable precautions, of bees building good combs on bare metal, their general choice of propolis and old wax for making a *start* of cell building; and the successful brood rearing on such bare metal when adequate insulating management is followed and adhered to.
>
> "Regarding the metal comb, probably the best known initiative is that of the celebrated Moses Quinby, who utilised ribbon metal for making a small skeleton comb, which he waxed and inserted in the centre of an ordinary wax one, with gratifying results. His interesting experiments are recorded in his noted work, '*The Mysteries of Beekeeping Explained*,' the first edition of which appeared in 1853."

Seradella Seed.—Mr. G. G. Desmond, of Sheepscombe, Stroud, Glos., is offering gratis to beekeepers forwarding to him stamped addressed envelopes a limited quantity of seed of this fodder plant, which is "unknown in this country, but much esteemed in Germany." He says that he should call it "a half-clover, the blossom a sort of aborted papilionaceous. It blossoms late, and comes in with heather, in most districts."

Beekeepers' Supplies.—Readers are reminded that we do *not* stock or sell beekeepers' supplies, including germicides. These should be ordered direct from our advertisers.

Dr. Rennie's Crawler Trap.—This Patent appliance will soon be on the market. If it could be produced in a form adaptable to practically any hive, it should command a wide interest. In due course we shall publish an illustrated review of it.

The Last Issue of THE BEE WORLD.—Copies of the last issue of THE BEE WORLD are practically sold out. A limited number of copies are reserved for would-be members. Our best thanks to readers for their esteemed appreciation of our efforts. A large number of them have been good enough to say some kind words by letters or post-cards, and with a rare spirit of enthusiasm that can never be forgotten. Hundreds of letters have literally flooded our office, which we regret the impossibility of acknowledging privately. Here are a few typical comments from letters taken haphazardly:—

"This last issue is tremendous. There is not one possible thing to say other than to accept it as a masterpiece. Really, the work must have been a labour of love, otherwise you could never have produced such a paper."—D. F., Pinner.

"I was delighted to find here this evening THE BEE WORLD. I have been looking it through, and congratulate you very heartily on it. It appears to me a wonderful number, and the general appearance up to previous standard as to printing, etc., if not better. The number gives one some small idea of the mass of work it has involved to you."—W. J. L., Chiswick.

"Hearty congratulations on the paper. It is very fine."—B. C. B., Sonning Common, Reading.

"I sincerely congratulate you on its general 'get up.' I shall read it with interest."—W. L. B., Birmingham.

"It is a very fine issue, and if you could strike off a lot of copies at a cheap rate for propaganda purposes, the sale of THE BEE WORLD would further go up."—J. N. K., Stocksfield.

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Recent Press Reviews.—Reviewing the start of our second volume the Editor of "*The Lancet*" was good enough to remark: "The 1920 June-September number contains much evidence of the enthusiastic support given to the journal by those who labour in this exacting industry, and includes an interesting article on the re-stocking with bees of the devastated areas of France and Belgium by the War Victims' Relief Mission of the English and American Society of Friends."

* * *

"THE BEE WORLD, which is backed by an international spirit, which seems no less, if not even greater, than the enthusiasm shown by the late Swiss internationalist Edouard Bertrand, of Nyon, has by sheer merit made its way in no more than a year to the front rank of bee literature. Its few critics, from our own experience, are chiefly the adventurers who keep meeting with disappointments in attempting to divide the craft on itself for the gratification of their petty jealousies and recriminations."—"*The B.B.J.*"

* * *

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Commemorating Our Birthday.—The profound enthusiasm with which the progress of THE BEE WORLD has been and continues to be greeted has encouraged us to print an appreciable number of surplus copies of this issue at the suggestion of some of our members. As many of our readers as possible will receive two copies, in the hope that the start of our third volume will be commemorated by each securing for the paper an additional reader. We trust all of them will act in unison with those friends who kindly urged this on us, prophesying a gratifying result. Remember: *"Sympathy is two hearts tugging at one load."*

Our Clubbing Offers.—Many of our readers are doubtless aware of the recent transference of the proprietorship of the *"British Bee Journal"* and the *"Beekeepers' Record"* to our good friend Mr. J. Herrod-Hempsall, F.E.S., whose support to our work has been, from its beginning, both generous and consistent. It is with great pleasure that we announce the willingness of the *"B.B.J."* office to supply to regular readers of the *"Journal"* our paper as published commencing mid-June, at £1 per annum for both papers. A second offer is the supply of both the BEE WORLD and the *"Beekeepers' Record"* at 12s. 6d. per annum, commencing the same date. A third offer is the supply of the three papers at 22s. per annum. Our readers can avail themselves, through us, when renewing their subscriptions of any of these offers. We need not emphasise the improvements introduced in our contemporaries and the value of studying more than one bee paper to those who wish to keep abreast of the progress of beekeeping. The transfer of the proprietorship of the *"Journal"* and *"Record"* preceded the permanent appointment of Mr. William Herrod-Hempsall, F.E.S., to the position of Apicultural Expert to the Ministry of Agriculture. We take this opportunity to offer W. H. H. our heartiest congratulations on this additional mark of confidence.

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Mid Monthly.
THE BEE WORLD
BENSON, OXON.

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Edited by A. Z. ABUSHADY, F.R.M.S.

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Having regard to the limitations of our space, our able contributors will greatly assist by considering 500 words a maximum limit for any single contribution as an article. Letters to the Editor for publication should be very brief.

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